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# The Application of Self-Affirmation Theory to the Psychology of Climate Change

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Thesis submitted for the degree of Doctor of Philosophy

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I, Anne-Marie van Prooijen, hereby declare that this thesis has not been and will not be, submitted in whole or in part to another University for the award of any other degree.

**Signature:**.....

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University of Sussex

Anne-Marie van Prooijen, PhD-degree

## The Application of Self-Affirmation Theory to the Psychology of Climate Change

### Summary

Research has shown that self-affirmation often leads to more adaptive responses to messages that focus on behaviour-specific, individual threats. However, little is known about the effects of self-affirmation in the context of a multifaceted collective threat, such as climate change. In the current thesis I apply self-affirmation theory to the psychology of climate change. More specifically, I propose that differentially polarized environmental orientations can have an impact on self-affirmation effects. In Chapter 1, I provide a general integration of the self-affirmation literature, the literature on sceptical responses to climate change, and the findings reported in the current thesis. The results from six empirical studies are presented in the following four chapters. In Chapter 2, I present findings that indicated that sceptical responses to climate change information are not always reduced through self-affirmation, but are instead strongly dependent on people's initial levels of rejection of environmental problems. In Chapter 3, I suggest that in the absence of a persuasive threatening message, self-affirmation can serve to validate a person's initial worldviews about environmental issues. In line with this suggestion, results demonstrated that self-affirmation led to more pro-environmental motives among participants with positive ecological worldviews but led to less pro-environmental motives among participants with negative ecological worldviews. In Chapter 4, I examine self-affirmation effects on the acceptance of climate change information. Results showed that self-affirmation promoted perceptions of greater climate change consequences and more self-efficacy among initially sceptical



participants. Additionally, self-affirmation reduced pessimism among less sceptical participants. In Chapter 5, I present evidence that showed that self-affirmation resulted in more acceptance of information portraying the UK's contribution to climate change problems among participants with high national identification, while group-affirmation resulted in more information acceptance among participants with low national identification. These effects were only apparent among participants with negative ecological worldviews.

## CHAPTER 1

# The Application of Self-Affirmation Theory to the Psychology of Climate Change: An Introductory Overview

There is an international consensus among scientists that the accelerated pace in which the earth's climate is warming can largely be attributed to the increase in greenhouse gas concentrations generated by human activity, and that this change in climate poses a multifaceted threat that can have detrimental consequences for human populations and ecosystems worldwide (IPCC, 2007a; Oreskes, 2004). Yet, the growing concern among scientists about climate change does not seem to be reflected in the public response to information regarding the severity of potential climate change impacts. People tend to believe that environmental campaigns are exaggerating the environmental problems that we are facing (Whitmarsh, 2011) and that climate change only poses a moderate risk that will mainly affect geographically and temporally distant people and places (Leiserowitz, 2005). People often try to minimize anthropogenic climate change consequences (i.e. climate change consequences caused by human activity) and resist information on this topic (Dickinson, 2009; Langford, 2002; Norgaard, 2006). The rejection of environmental threats can pose a serious obstacle to stimulating effective individual reductions in carbon emissions, as the failure to accept the urgency of the need to mitigate climate change consequences can reduce the likelihood that people will adopt more pro-environmental behaviours (Gifford, 2011).

The aim of the present introductory overview is to address the psychological obstacles that militate against persuading people of the severity of climate change, using self-affirmation theory as a framework. Self-affirmation theory proposes that people are motivated to preserve a positive self-image in which the self is perceived as adaptively and morally adequate (Steele, 1988). Defensive responses are activated when the self-image is threatened and function to restore the self-image by distorting the threat. A more adaptive way to protect the self-image is to affirm a central, valued aspect of the self-concept to re-establish the positive self-image. The boost in self-worth through self-

affirmation reduces the need to resort to defensive mechanisms and promotes an unbiased and open approach to the threat.

In this introductory overview I argue that in order to reduce the rejection of climate change information and to change people's environmental beliefs, it is essential to examine how climate change may present a threat to the self-image and how people can be motivated to use adaptive, nondefensive strategies to cope with climate change threat. I will first explain how climate change can be seen as a potential threat to the self-image, and how affirming self-worth has been shown to eliminate self-threats. I then review factors that encourage people to reject the existence of climate change. These factors will be integrated with insights from self-affirmation theory to propose pathways through which climate change scepticism might be attenuated. As climate change poses a collective threat, I will also discuss findings on group-affirmation effects in comparison to self-affirmation effects. I will then present ideas for future research that have not been covered in the current thesis. Finally, an overview of the empirical chapters in this thesis is presented, which is followed by the implications and the limitations of the current thesis.

### **Climate change as a threat to the self-image**

One of the central tenets of self-affirmation theory is that defensive responses can originate in situations where the positive self-image is threatened (Steele, 1988). Whereas it has been established that climate change can pose a significant threat to human welfare (IPCC, 2007b), it is less clear how one's regard of the self might be threatened by climate change problems. As self-affirmation can provide a buffer against threats to the self-image, it is important to clarify which psychological processes related to climate change can potentially threaten people's self-worth.

### **Cognitive dissonance**

People often encounter situations in which they conduct behaviour that contradicts their own valued standards by, for example, engaging in acts that may potentially harm the well-being of the self or of others. This inconsistency between two cognitions can arouse cognitive dissonance, a state of psychological discomfort in which people are motivated to reduce the discrepancy that caused the dissonance (Festinger, 1957). Reducing the state of dissonance can be accompanied by several potentially maladaptive defensive responses, such as a change in attitude, trivializing the dissonance, or a rationalization of the act, which are aimed to justify the discrepant behaviour (Simon, Greenberg, & Brehm, 1995; Stone & Cooper, 2001).

In relation to climate change, it has been suggested that people can experience dissonance due to a discrepancy between their belief that it is important to mitigate climate change consequences and the level of their actual engagement in pro-environmental behaviour. Research has indicated that, in spite of expressing genuine concern about both the causes and the consequences of climate change, people have developed a range of psychological defensive mechanisms, such as the minimization of the individual contribution to the problem, in order to reduce the dissonance aroused by the lack of pro-environmental behavioural change in their current lifestyles (Norgaard, 2006; Stoll-Kleemann, O’Riordan, & Jaeger, 2001).

### **Individual self-image threat**

Whereas the theory of cognitive dissonance suggests that the inconsistency between cognitions causes a negative and unpleasant state (Festinger, 1957), self-affirmation theory posits that it is not the unpleasantness of the inconsistency itself that is disturbing to people, but rather how this inconsistency threatens the positive image of the self (Steele, 1988; Steele & Liu, 1983). If an individual values the protection of the

environment while simultaneously having a high carbon-emission lifestyle, this inconsistency may violate one's personal norms and is thereby likely to threaten the individual image of the self as a rational and moral person who does not contribute to environmental damage (Stoll-Kleemann et al., 2001). Alternatively, when people with strong sceptical beliefs about the reality of anthropogenic climate change are confronted with counterattitudinal evidence regarding the impact of greenhouse gas emissions generated by human activity on environmental problems, the information is inconsistent with their personal views and might therefore be perceived as a threat to cherished, long-held beliefs that are tied to important aspects of the individual identity (Cohen, Aronson, & Steele, 2000; Sherman & Cohen, 2006). According to self-affirmation theory, people do not strive to resolve psychological inconsistencies but instead strive to maintain a sense of self-integrity as being "adaptively and morally adequate, that is, as competent, good, coherent, unitary, stable, capable of free choice, capable of controlling important outcomes, and so on" (Steele, 1988, p. 262). Self-affirmation has been shown to reduce psychological discomfort and the need for self-justification in situations that evoke dissonance (Matz & Wood, 2005; Steele & Liu, 1983), which demonstrates that people are able to tolerate cognitive dissonance if their general self-integrity has been boosted by affirming valued aspects of the self.

### **Collective self-image threat**

Research has indicated that climate change can also present a threat to the collective self-image (i.e. group identities, such as citizenship of a country, or being a member of a team). People tend to display defensive biases in favour of their country by refusing to accept the national contribution to climate change problems in order to protect their collective self-image, as this negative national contribution can challenge the perception of their country as being environmentally responsible and egalitarian

(Norgaard, 2006).

Although self-affirmation theory originally focused on reducing defensiveness towards individual self-image threats (Steele, 1988), self-affirmation has also been applied to threats that concern the collective self-image. Group membership can be an important aspect of the self-image and therefore constitutes a valuable source of self-worth (Cohen & Garcia, 2005; Ellemers, Spears, & Doosje, 2002). Consequently, people are motivated to maintain both a positive individual self-image and a positive collective self-image, which can cause defensiveness to information that threatens the self-image (Tajfel & Turner, 1979). General self-worth can be boosted by affirming a valued aspect of the individual self-image, which thereby should make a threat to the collective self-image more endurable, as the collective self-image is a part of the self-definition (Sherman & Cohen, 2006).

In support of this reasoning, self-affirmation has been shown to lead to beneficial effects on defensiveness towards collective self-image threats. For example, self-affirmation promoted more openness to counterattitudinal arguments about U.S. foreign policy among American participants to whom their national identity was either made salient or was central to their general self-definition (Cohen et al., 2007). Additionally, it has been shown that affirmed White participants reported greater perceptions of racism, rated the average White person as more racist, and reported stronger beliefs that White people understate racism than nonaffirmed White participants (Adams, Tormala, & O'Brien, 2006).

### **The examination of self-image threats in the current thesis**

The four empirical chapters that are included in the current thesis all focused on different sources of climate change information. Whereas the information used in Chapter 2 focused on statements regarding the discrepancy between the severity of

climate change consequences and the lack of individual and collective action undertaken to mitigate climate change, Chapter 4 focused on the acceptance of (counterattitudinal) information regarding anthropogenic climate change consequences. The information that was provided in Chapter 5 focused specifically on the negative contribution of UK's carbon emissions to climate change problems in order to examine how self-affirmation can influence responses to collective self-image threat. In Chapter 3 no information was presented in order to test the effects of self-affirmation in the absence of an explicit threat.

Although it is likely that different aspects of the self-image were threatened across the empirical chapters due to the use of different sources of information, the current thesis did not explicitly examine how self-perception might be altered through different types of climate change information. An assumption in self-affirmation literature is that defensive responses are manifested when the positive perception of the self-image is threatened, and that self-affirmation can boost self-worth and thus can reduce concerns about the implications of the threat to the positive self-image. However, little research has empirically examined whether people perceive the messages that are commonly used in self-affirmation studies as threatening to the self-image. Additionally, although self-affirmation has repeatedly been shown to reduce defensive responses (Sherman & Cohen, 2006), it remains unclear what drives these effects. Future research might therefore examine whether self-perception is influenced by potentially threatening information, and which mechanisms underlie self-affirmation effects.



### **The rejection of anthropogenic climate change**

There are several factors that can encourage rejection of the notion of anthropogenic climate change in order to protect the self-image and that can help to justify a lack of engagement with climate change. In this next section these factors that can reduce the motivation to commit to pro-environmental actions will be discussed.

#### **Biased information processing**

Despite the increasing evidence that humans have a substantial impact on climate change (IPCC, 2007a), many people tend to respond sceptically to information that describes anthropogenic causes of environmental problems (Langford, 2002). Conclusions that people draw from a message can be more strongly based on people's prior worldviews than on the actual content of a message (Ditto, Scepansky, Munro, Apanovitch, & Lockhart, 1998; Lord, Ross, & Lepper, 1979). People are motivated to resist information that presents evidence that disconfirms their opinions, as this information can have negative implications for their self-image, and tend to scrutinize the information in order to search for faults that justify discrediting the evidence (Ditto & Lopez, 1992). In contrast, information that supports people's initial opinions is less critically examined and more readily accepted. Moreover, when mixed evidence is presented to people with opposing attitudes, they assimilate the information that conflicts with their attitudes in a biased manner: Evidence supporting their views is perceived to be more reliable and convincing than evidence disconfirming their views (Corner, Whitmarsh, & Xenias, 2012; Lord et al., 1979). These biases can restrict the potential to learn from information, and it can even have a negative influence on one's personal welfare. For example, when people are confronted with a message about a health threat that is personally relevant to them, the parts of a message that are perceived to be threatening tend to be more critically evaluated than the reassuring parts

of a message, which is likely to result in a rejection of the message (Liberian & Chaiken, 1992).

The defensiveness towards threatening messages can already be detected at an early stage of information processing; neuroscientific evidence from event-related brain potentials showed that the self-relevance of a threatening health message can evoke more efficient attention disengagement (Kessels, Ruiter, & Jansma, 2010). Similarly, Klein and Harris (2009) used a visual-dot-probe task as an implicit measure of attentional bias, and found that moderately heavy alcohol consumers who were asked to read a threatening message about the health-risks of alcohol consumption showed an attentional bias away from threatening words in the message. However, when these participants were self-affirmed, the effect was reversed; affirmed moderately heavy drinkers showed a bias towards the threatening words in the message. Another study conducted by Van Koningsbruggen, Das, and Roskos-Ewoldsen (2009) demonstrated that a self-affirmation manipulation before a message about health-risks increased the accessibility of threat-related cognitions among participants to whom the message was relevant. These studies indicate that reducing the concerns about threats to the self-image through self-affirmation can alter implicit defensive information processing at an early stage.

The biased processing of relevant health-risk messages has repeatedly been shown to be reduced by self-affirmation. Compared to nonaffirmed people, affirmed people are less defensive and more open to a health-risk message, show greater message acceptance, and report more intentions to change their behaviour accordingly (Harris & Napper, 2005; Jessop, Simmonds, & Sparks, 2009; Sherman, Nelson, & Steele, 2000). Furthermore, resistance to information that contradicts valued beliefs tends to be attenuated by self-affirmation, as people become more open to counterarguments and

more critical of their own beliefs (Cohen et al., 2000). In relation to climate change, self-affirmation can result in greater acceptance of negative anthropogenic climate change consequences among people with initially sceptical beliefs about the human impact on ecological stability (Van Prooijen & Sparks, 2012; Chapter 4). The mechanism underlying this increase in openness to threatening messages appears to stem from a stronger ability to objectively evaluate information; self-affirmation can lead to stronger sensitivity to the strength of both pro-attitudinal and counterattitudinal arguments due to the diminished concerns about how the information may pose a threat to the self-image (Correll, Spencer, & Zanna, 2004).

It should be noted, however, that self-affirmation can also result in less effective reasoning strategies in certain situations. The motivation to reject threatening information can elicit a strong desire to scrutinize and dismiss the message among nonaffirmed people (Ditto & Lopez, 1992; Lord et al., 1979). Even though this motivated reasoning can lead to a strong bias in information processing, it also enables people to detect invalid arguments due to a more effortful analysis of the information (Ditto et al., 1998). Self-affirmation has been demonstrated to produce less accurate judgements in a context where a sceptical mindset towards the information is beneficial (Munro & Stansbury, 2009). Whereas most self-affirmation studies focus on contexts in which openness to information is advantageous, relatively little is known about self-affirmation effects on responses to persuasive but invalid information. As the available information in the media often understates the severity of climate change consequences (Freudenburg & Muselli, 2010), it is important to explore whether self-affirmation can promote more constructive responses to climate change when biased information that dismisses anthropogenic evidence is presented.

Moreover, little research has examined self-affirmation effects in contexts where mixed information containing balanced arguments of equal strength is presented. Due to the abundance of available information in the media that ranges from a strong sceptical stance towards climate change to a highly alarmist view, it is essential to investigate whether self-affirmation can lead to more constructive beliefs about climate change when people are exposed to information that consists of a mixture of pro- and anti-anthropogenic climate change arguments. In a situation where no climate change information was presented to challenge people's views, self-affirmation resulted in a polarization of initial environmental beliefs, which indicates that self-affirmation may encourage people to trust their previously formed opinions in a nonpersuasive context (Van Prooijen, Sparks, & Jessop, in press; Chapter 3). However, if people become more open to counterattitudinal arguments and more critical of their own views by affirming the self before a message is presented (Correll et al., 2004), information that focuses on mixed evidence may potentially lead to more neutral opinions about climate change.

### **The moderating effect of environmental beliefs.**

The personal importance of beliefs is a strong determinant of biased information processing. People are motivated to defend beliefs that are important to the self-image by, for example, resisting information that presents counterattitudinal evidence (Ditto & Lopez, 1992; Liberman & Chaiken, 1992; Lord et al., 1979; Steele, 1988). However, beliefs that are of low importance to the self are less likely to elicit defensiveness, as contradictory evidence to these beliefs will have few implications for judgements of self-worth. In line with this reasoning, self-affirmation has been shown to be most effective in reducing defensiveness in response to threatening information among people to whom the information is of high personal importance (Harris & Napper, 2005; Reed & Aspinwall, 1998). For example, Correll et al. (2004) demonstrated that

affirming the self-image promoted increased sensitivity to the strength of both proattitudinal and counterattitudinal arguments and decreased biased information processing only among participants who considered the issue that was raised in the information as personally important.

Climate change is a well-covered topic in the media, and has provoked many public debates between people with opposing views (Freudenburg & Muselli, 2010). Consequently, most people in the western world are regularly confronted with information about climate change, and have formed environmental beliefs that can potentially affect the processing of climate change information (Van Prooijen & Sparks, 2012; Chapter 2). In this thesis I therefore suggest that environmental beliefs are likely to moderate self-affirmation effects in a climate change context. In support of this suggestion, my results showed that self-affirmation enhanced the acceptance of the severity of climate change consequences after reading climate change information among people who were sceptical about the human impact on climate change, while self-affirmation reduced pessimism about climate change information among people with less sceptical environmental beliefs (Van Prooijen & Sparks, 2012; Chapter 4). These findings are consistent with previous research that showed that self-affirmation increased concern about a potentially threatening issue among highly defensive people, whereas self-affirmation reduced concern among people who were low in defensiveness (Griffin & Harris, 2011). Furthermore, another study has demonstrated that in the absence of potentially threatening climate change information, self-affirmation accentuates prior ecological worldviews among people with more polarized views (Van Prooijen et al., in press; Chapter 3). Taken together, these findings consistently show that self-affirmation effects are mainly effective among people who have relatively strong environmental beliefs. It is likely that these more polarized beliefs, regardless of

whether these beliefs are sceptical in nature or are supportive of the human impact on climate change, reflect greater personal importance of environmental problems and greater issue involvement, which in turn can lead to arousal of dissonance and a stronger perceived threat to the self-image (Aronson, 1999). For example, people who value their sceptical environmental beliefs may feel threatened by anthropogenic climate change information as it presents a counterattitudinal perspective. It is therefore important to consider people's prior environmental beliefs when assessing the impact of self-affirmation on the resistance to information about climate change.

### **Origins of climate change scepticism.**

In the current thesis it is demonstrated that prior ecological worldviews and (more specific) environmental beliefs moderate self-affirmation effects in a climate change context. Whereas results have indicated that self-affirmation can reduce the rejection of counterattitudinal information about climate change among people with initially sceptical beliefs (Van Prooijen & Sparks, 2012; Chapter 4) and people with negative ecological worldviews (Chapter 5), the current thesis does not explicitly examine where these environmental beliefs stem from, which could provide more insights into the reasons *why* people might perceive counterattitudinal climate change information as a threat to the positive self-image.

One of the determinants of sceptical environmental beliefs is political orientation, in which more conservative political views are associated with scepticism about the reality of climate change, rejection of anthropogenic climate change information, and lower endorsement of pro-environmental values (Dunlap, Xiao, & McCright, 2001; Hamilton, 2011; McCright & Dunlap, 2011a; Poortinga, Spence, Whitmarsh, Capstick, & Pidgeon, 2011; Whitmarsh, 2011). Pursuing the mitigation of climate change can potentially threaten the ideology and the capitalistic interests of the

Conservative movement (McCright & Dunlap, 2003), as environmental policies to reduce greenhouse gas emissions can lead to governmental restrictions and can require significant changes in industrial organizations in terms of, for example, the use of fossil fuels (IPCC, 2007a). In addition, pro-environmental actions are often not compatible with the affluent lifestyle that can result from industrial capitalism (Gifford, 2011; McCright & Dunlap, 2003). People with conservative political views are therefore likely to be motivated to protect these core elements of the Conservative movement by challenging the validity of environmental concerns regarding climate change consequences (McCright, 2011; McCright & Dunlap, 2011b).

It has been argued, however, that the effect of political conservatism on scepticism about climate change can be explained in part by system justification motives—the tendency to perceive the social system and the status quo as legitimate in order to maintain a sense of stability and certainty (Jost & Hunyady, 2002). The desire to justify the status quo is stronger among people with conservative political views in comparison to people with liberal political views (Jost, Nosek, & Gosling, 2008). System justification has been shown to partially account for the effect of political orientation on scepticism about climate change, and is associated with stronger rejection of environmental problems that challenge the current social and economic system (Feygina, Jost, & Goldsmith, 2010). Although the current thesis has specifically focused on the moderating effect of environmental beliefs (Chapter 2 and Chapter 4) and broader ecological worldviews (Chapter 3 and Chapter 5) on the impact of self-affirmation on responses to climate change, it is worthwhile for future research to explore whether the impact of political orientation and system justification on scepticism about climate change can be attenuated through self-affirmation.

### **Expectations of climate change consequences**

Whereas scientists anticipate that humanity will face severe climate change consequences (IPCC, 2007a; Oreskes, 2004), it appears that the general public has relatively low expectations about climate change impacts, which in turn can undermine pro-environmental motives. One reason for these relatively low risk expectations is the level of uncertainty that accompanies climate change (Gifford, 2011). Despite the growing scientific consensus about the human impact on climate change (Oreskes, 2004), it is unavoidable that scientists have a degree of uncertainty about climate change models as probability terms are used to determine the likelihood of specific outcomes. However, research has shown that probability terms that are presented by the IPCC are incorrectly interpreted by the public and lead to higher perceived levels of imprecision of IPCC findings than is intended (Budescu, Broomell, & Por, 2009). This uncertainty surrounding climate change can function as a reason for not participating in pro-environmental actions and can increase rejection of the severity of climate change (Norgaard, 2006). Furthermore, uncertainty in resource dilemmas has been shown to promote behaviour focused on self-interest that leads to resource depletion and to enhanced optimism regarding the future outcomes of the resource size (Jager, Janssen, & Vlek, 2002; Joireman, Posey, Truelove, & Parks, 2009). This, in turn, can have detrimental effects on environmental problems, as the uncertainty that is associated with climate change can consequently lead to depletion rather than conservation of limited natural resources (Hine & Gifford, 1996).

In relation to uncertainty, the optimism that people tend to have about their own personal risk of experiencing negative outcomes compared to the risk of others might be another reason why climate change consequences are often underestimated (Kunda, 1987; Weinstein, 1980). For example, Pahl, Harris, Todd and Rutter (2005) have



demonstrated that this comparative optimism - which has been defined as “a belief that one is less likely to experience negative events and more likely to experience positive events than are other people” (Shepperd, Carroll, Grace, & Terry, 2002, p.65)- is displayed for a wide range of environmental risks and is not limited to people who are not involved in pro-environmental behaviour, but is also found among environmental activists. Furthermore, people tend to perceive problems that are relatively proximate as less severe than problems that are more distant on a spatial and temporal level (Gifford et al., 2009). The optimistic view that one is unlikely to be personally affected by climate change may reduce the perceived urgency of taking mitigating action against environmental problems.

Self-affirmation has been shown to be effective in promoting the acceptance of health-related risk information (Harris & Napper, 2005; Reed & Aspinwall, 1998; Sherman et al., 2000). However, in this thesis I present findings that illustrate that these effects of self-affirmation in the health domain can be generalized to the environmental domain: When participants read information describing the severity of global climate change consequences, self-affirmation increased the acknowledgement of these dangers among participants with initially sceptical beliefs. Moreover, while the information presented focused solely on potential general global consequences, thereby maintaining uncertainty about consequences in more specific locations, self-affirmation also enhanced a generalization of the information to more proximal consequences of climate change that were not explicitly targeted by the information (Van Prooijen & Sparks, 2012; Chapter 4). These findings thereby suggest that both the optimism about the risk of being personally confronted with climate change and the rejection of the severity of climate change due to uncertainty regarding the occurrence of negative climate change outcomes can be attenuated through self-affirmation. Both obstacles might provide

strategies to protect the self-image by minimizing the risks attached to climate change, and the need to apply these strategies appears to be reduced when the self-worth is affirmed.

### **Group-affirmation and defensiveness towards collective threats**

Climate change represents a global, collective threat that is difficult to influence at an individual level, and individual behaviour to mitigate climate change consequences is often perceived to be ineffective by the public (O'Connor, Bord, & Fisher, 1998). The most effective actions to mitigate climate change consequences require an international cooperation between multiple groups and nations (IPCC, 2007a; Stern, 2006). However, the responsibility for a collective problem can be diffused due to the fact that multiple groups are involved, which in turn can enhance intergroup biases (Gifford, 2008; Johnson & Levin, 2009). Research has demonstrated that citizens tend to display defensive biases in favour of their country by refusing to acknowledge the harmful national contribution to climate change problems and by justifying substantial national greenhouse gas emissions through, for example, shifting the blame of climate change to the greenhouse gas emission levels of other countries (Norgaard, 2006).

Although self-affirmation can enhance the acceptance of threatening information about a group with which one identifies (Adams et al., 2006; Cohen et al., 2007), research has recently started to examine whether an affirmation of the collective self-image (i.e. group-affirmation) can also reduce defensiveness towards collective threats. For example, group-affirmation has shown to be more effective in reducing group-serving attribution biases than self-affirmation among fans who highly identified with the basketball team that they supported, while self-affirmation was more effective in attenuating defensiveness than group-affirmation among low identified fans (Sherman,

Kinias, Major, Kim, & Prenovost, 2007). It was argued that, as the group is more central to the self-definition for people who highly identify with their group, the group provides a better affirmation resource for highly identified group members than for low identified group members.

In the current thesis (Chapter 5), the effects of group-affirmation were compared with the effects of self-affirmation among UK citizens on the need to justify the harmful greenhouse gas emissions of the UK and the consequences that these emissions can have on developing countries. Results showed that self-affirmation led to a lower need to justify UK greenhouse gas emissions than did group-affirmation among highly identified UK citizens with sceptical environmental beliefs; in comparison to group-affirmation, self-affirmation promoted less attribution of blame for climate change to other countries, less rejection of climate change consequences on developing countries, and stronger moral judgment about pro-environmental behaviour. In contrast to previous findings (Derks, Scheepers, Van Laar, & Ellemers, 2011; Derks, Van Laar, & Ellemers, 2009, Sherman et al., 2007), my findings indicate that participants who highly identified with the threatened group benefitted more from a self-affirmation than from a group-affirmation. This discrepancy in findings can potentially be explained by the nature of the targeted threat.

Whereas previous literature on the effects of identification and group-affirmation on defensive responses towards collective threats have focused on collective threats to group-performance, my study focused on a collective threat that is associated with group-morality. As climate change is strongly influenced by human greenhouse gas emissions of developed countries and is likely to have severe effects on nations that hardly contribute to climate change (IPCC, 2007b), climate change can be perceived to be an ethical issue (Lorenzoni & Pidgeon, 2006). Moreover, as the consequences of

climate change can be attributed to our own harmful behaviour, it can pose a threat to moral values that are an important aspect of our positive self-image. Information about anthropogenic climate change can therefore increase feelings of guilt, which in turn can enhance the motivation to shift the responsibility to others in order to maintain the positive self-image (Rothschild, Landau, Sullivan, & Keefer, 2012). I suggest that threats to the morality of the group with which one identifies might be more difficult to cope with than threats to the performance of the group. By affirming the collective self, the self-relevance of the collective threat to group morality may increase among people who perceive the group to be an important part of their self-definition, which in turn may promote stronger group biases than the affirmation of the individual self.

In addition, I found that self-affirmation promoted higher perceived collective efficacy with regard to reducing climate change consequences than did group-affirmation among highly identified UK citizens with sceptical environmental beliefs. This finding can have positive implications for the motivation to reduce individual carbon emissions, as perceived collective efficacy to change climate change outcomes has shown to be an important determinant of pro-environmental behaviour (Homburg & Stolberg, 2006). Overall, these findings indicate that, despite the collective nature of the threat that climate change represents, affirming the individual self-image appears to promote more willingness to accept the national contribution to climate change problems than does affirming the collective self-image.

### **Future directions**

In the current introductory overview I have described how climate change can evoke biased responses, how self-affirmation can reduce resistance to information presenting evidence of anthropogenic climate change, how the findings of this thesis can be integrated with the previous literature, and suggested directions for future

research. However, there are several other aspects of climate change responses and self-affirmation theory that are worth exploring in subsequent studies, but that have not been covered in the current thesis. In the following section additional avenues for future research will be introduced. I will discuss which values have been associated with pro-environmental behaviour, and how affirming specific values may influence the effects of self-affirmation on responses to climate change. I will also discuss through which processes perceptions of climate change risk are formed, how these processes can create barriers to motivate people to change their behaviour, and whether self-affirmation can potentially influence these processes. Then, research that focused on the effects of self-affirmation on behaviour change will be reviewed.

### **The affirmation of values**

Values represent self-imposed principles that vary in importance, and can reflect desirable broad goals that one is motivated to obtain and that transcend context and time (Schwartz, 1992). Personally endorsed values can shape beliefs and guide consequent behaviour (Bardi & Schwartz, 2003; Gärling, 1999; Stern, 2000). In relation to pro-environmental behaviour, research has demonstrated that when people endorse self-enhancement values (i.e. values related to the enhancement of personal success), they were less likely to behave in a pro-environmentally friendly manner, whereas people with stronger pro-social values were more determined to conduct pro-environmental behaviour (De Groot & Steg, 2010). However, it is important to note that pursuing certain values can result in consequences that conflict with other endorsed values that express opposite motives. For example, self-transcendence values (i.e. prosocial values related to egalitarianism and concern for the welfare of others) that promote pro-environmental behaviour can in certain contexts be incompatible with values that are related to self-enhancement (Maio, Pakizeh, Cheung, & Rees, 2009). When people

strive to obtain personal successes, it often stimulates behaviour that can increase carbon footprints, such as driving a big car or conspicuous luxury consumption behaviour (Gifford, 2011). As perceived self-competence has a strong influence on people's self-evaluation (Wojciszke, 2005), it is likely that many people who value the environment may also engage in some form of behaviour that is discrepant with these pro-environmental values, which implies that the discrepancy between pro-environmental values and high carbon-emission behaviours might result in defensive responses towards climate change information.

In the self-affirmation literature, the most widely used technique to affirm people is to provide a short list of values, from which participants are asked to select the value that is most important to them and to write a few sentences to describe why this value is important to them. In this context, a range of different values have been used in self-affirmation manipulations under the assumption that these different values all serve to lead to the same goal of bolstering a sense of self-integrity (McQueen & Klein, 2006). However, research has demonstrated that the value that is affirmed can influence the subsequent effects in responses. For example, when people were asked to complete a threatening serial subtraction task, the affirmation of intrinsic values (i.e. core personal values) resulted in less self-handicapping and better task performance than did the affirmation of extrinsic values (i.e. values related to other-determined standards; Schimel, Arndt, Banko, & Cook, 2004). In relation to climate change, when American undergraduate participants were confronted with information in which young Americans were identified as the main contributors to climate change, participants showed lower tendencies to blame international corporations for climate change when their moral value was affirmed than when their personal control was affirmed. In contrast, when the presented information stated that it has not yet been determined what

the main cause of climate change is, the affirmation of personal control resulted in a lower tendency to blame international corporations for climate change than did an affirmation of moral value (Rothschild et al., 2012). The effectiveness of the self-affirmation manipulation was therefore dependent on the aspect of the self-concept that was threatened by the climate change information; self-affirmation provided an adaptive strategy to restore the self-concept if the self-affirmation was focused on the specific aspect of self-perception that was threatened, which then prevented the need to resort to the less adaptive strategy of scapegoating international corporations.

Additionally, there is evidence suggesting that the affirmation of certain values can lead to backfire-effects, in which self-affirmation increases rather than decreases biased responses and resistance to change (Sherman & Cohen, 2006). Several studies have shown that dissonance or defensiveness can increase when self-affirmations are in a domain related to the self-threat (Aronson, Blanton, & Cooper, 1995; Sivanathan, Molden, Galinsky, & Ku, 2008). A relevant affirmation can highlight the personal standard that was violated, which enhances the need for self-justification. For example, Blanton, Cooper, Skurnik, and Aronson (1997) asked participants to write a counter-attitudinal essay which advocated a cut in funding for services for handicapped students. Participants were reaffirmed by providing bogus personality feedback on either their creativity (unrelated affirmation) or on their compassion (related affirmation). The most favourable attitude toward cutting the funding was found in participants who received a relevant affirmation, which suggests that the focus on dissonance that was evoked by the affirmation triggered a self-justifying attitude change.

It should be considered that most of these studies have presented the threatening information before the self-affirmation manipulation was introduced (e.g., Aronson et al., 1995; Blanton et al., 1997; Rothschild et al., 2012). Critcher, Dunning, and Armor

(2010) have argued that self-affirmation manipulations are only effective if they are introduced before the initiation of a defensive response. If the self-image is restored by a defensive response to the threat, a subsequent self-affirmation manipulation is unlikely to be effective, as the threat to the self has already been alleviated through the defensive process. It is therefore important to also investigate the effects of affirming different values prior to a threat. Within the priming literature, writing about reasons why the value of equality has personal importance has been shown to lead to egalitarian behaviour, whereas writing about the value of helpfulness increased helpful behaviour (Maio, Olson, Allen, & Bernard, 2001). As priming a set of values does not only promote value-congruent behaviour but also decreases value-incongruent behaviour (Maio et al., 2009), it is merited to examine whether the affirmation of specific values can activate motivations that enhance biased responses. In line with this reasoning, Lehmiller, Law, and Tormala (2010) found that affirming values about relationships with family and friends can increase the endorsement of traditional family values, which in turn was positively associated with prejudice towards homosexuality. It was suggested that these traditional family values tend to conflict with expressing tolerance of homosexuality, and the affirmation of values about relationships with family and friends can therefore undermine the reduction of prejudiced biases.

The suggestion that the affirmation of different values prior to a threat can promote different responses raises the issue whether certain self-affirmation effects are the result of priming values rather than affirming self-integrity. It has been shown that both implicit self-affirming primes and a standard self-affirmation manipulation led to better performance following academic threat and reduced defensive biases towards threatening health-risks (Sherman et al., 2009), thereby indicating that typical self-affirmation effects can also occur through priming tasks. Exploring the circumstances in



which priming effects and self-affirmation effects are fundamentally different is an interesting avenue for future research. The value-scale self-affirmation manipulation is commonly used in self-affirmation literature and often includes a list of values adapted from Allport, Vernon, and Lindzey (1960), which contains values that are related to economics, science, aesthetics, social life, politics, and religion (McQueen & Klein, 2006). The preference to use the list of values from Allport et al. (1960) stems from the necessity to create a context where it is unlikely that the presented threat is consonant with the value orientation and which therefore avoids priming effects (Steele & Liu, 1983). It should be noted, however, that the values ‘social life’ and ‘religion’ tend to be rated as most important by the majority of participants (e.g. Crocker, Niiya, & Mischkowski, 2008), which in turn have both been categorized as values that are related to self-transcendence across cultures (Schwartz, 1992). It can therefore be argued that the values used in many self-affirmation manipulations might not be neutral. More research is needed to clarify these issues.

### **Affective versus analytical evaluation of risk**

Perceptions of risk are formed as a result of both affective and analytical processes (Epstein, 1994; Slovic, 1996). Affective processes stem from an evolutionary need to respond rapidly to immediate dangers in our direct surroundings and can evoke emotional reactions such as fear, whereas the slower analytical processes are based on a cognitive evaluation of the more objective features of risk (e.g. the probability of experiencing specific outcomes). Although both types of processes can influence risk perceptions, it has been suggested that risk perceptions are more prominently driven by affective processes than by analytical processes. According to the risk as feelings hypothesis (Loewenstein, Weber, Hsee, & Welch, 2001), emotional responses to risk can be evoked without being mediated by analytical processes, while

emotional responses do mediate the effect of analytical processes on risk-related behaviour. In situations where the affective response to risk diverges from the analytical response, the resulting risk-related behaviour is often determined by the affective response, even though people are aware that the chosen course of action might not be rational. For example, people can experience strong irrational phobic reactions to highly unlikely events and show avoidance behaviour accordingly, while events that are more likely to occur do not elicit fear (Barlow, 1988). It is therefore important that people have a negative emotional response to a dangerous situation in order to motivate them to take action that can reduce the risk (Peters & Slovic, 2000).

An important determinant of fear responses to risk is the vividness of the mental representation of the threatening outcomes through, for example, personal experience (Loewenstein et al., 2001; Weinstein, 1989). It is uncommon, however, for people to personally experience a rare negative event resulting from climate change. The perceptions of the risk that climate change poses are more likely to be based on analytical processes than on affective processes, as most people learn about the probability of specific climate change-related outcomes from a statistical summary rather than from personal, more emotional experiences. Due to the low probability that people have been exposed to climate change-related events, the threat of climate change does not elicit strong fear responses, which in turn results in lower levels of concern than the objective probability of events would warrant (Weber, 2006). Even when people are personally exposed to climate change consequences, it does not necessarily increase their perceived risk of climate change. Research has indicated that people who were victims of flooding - which is considered to be one of the main threats that climate change can cause (IPCC, 2007b) - showed comparable responses to climate change as people who were not personally exposed to climate change consequences (Whitmarsh,

2008). Although the flooding in itself was considered to be a serious personal risk, it was perceived as a separate issue from climate change; the changing pattern of the weather was only considered to have an indirect contribution to the flooding.

Additionally, the abstract nature of climate change consequences also contributes to lower perceptions of risk of and limited fear responses to climate change. Research has indicated that events that are likely to occur in the distant future are construed in abstract terms that lack emotional involvement, while events that are proximate in time are construed in concrete terms that elicit strong affective associations (Trope & Liberman, 2003). As climate change represents a potential danger in the distant future for most people, the severity of climate change outcomes is unlikely to lead to strong feelings of concern (Weber, 2006). The abstract construal of climate change thereby mainly appears to lead to an analytical evaluation of climate change risks, while the affective evaluation of climate change risks should be reduced, as climate change is less likely to be construed in concrete, more emotional terms.

Although the emotional response to risk is an important factor in motivating people to take precautionary action (Loewenstein et al., 2001; Peters & Slovic, 2000), an intense emotional response to risk can also be maladaptive (O'Neill & Nicholson-Cole, 2009; Ruiter, Abraham, & Kok, 2001). Feelings of helplessness and denial can increase in situations where people experience strong anxiety about a potential threat and feel unable to influence the expected outcome (Lazarus & Folkman, 1984). These adverse effects of affective processing can be reduced through self-affirmation. Research has shown that affirming the self-worth can increase perceived efficacy to cope with threats (Epton & Harris, 2008; Harris, Mayle, Mabbott, & Napper, 2007), enhance positive affect (Koole, Smeets, Van Knippenberg, & Dijksterhuis, 1999) and attenuate psychological and physiological stress responses (Creswell et al., 2005;

Sherman, Bunyan, Creswell, & Jaremka, 2009). Moreover, it has been demonstrated that self-affirmation promotes the processing of information on a more abstract construal level (Schmeichel & Vohs, 2009; Wakslak & Trope, 2009), which suggests that self-affirmation might reduce defensiveness towards threatening information by enhancing the ability to focus on central, core aspects of events; this structured way of thinking would help individuals to see the big picture and would produce a clearer, more structured view of the self. Furthermore, self-affirmation has been shown to increase self-transcendence and positive other-directed feelings, thereby inducing a state of openness to self-improvement (Crocker et al., 2008). These findings indicate that self-affirmation may change the perspective that people have about threatening issues by raising awareness that a constructive and open mindset towards these issues is more important than is the distortion of temporary threats to the self-image.

Whereas self-affirmation has been shown to be successful in enhancing analytical processing of risks (Schmeichel & Vohs, 2009; Wakslak & Trope, 2009) and attenuating anxiety about risks (Creswell et al., 2005; Sherman et al., 2009), more research is warranted to examine how promoting greater acceptance of threatening messages through analytical pathways may influence emotional involvement in risk perception. As perceptions of climate change are mainly driven by analytical processes (Weber, 2006), while risk-related behaviour is mainly driven by affective processes (Loewenstein et al., 2001), it is important to determine whether self-affirmation results in an adaptive level of negative affective responses to climate change risks, whether self-affirmation primarily increases analytical processing of climate change information, or whether self-affirmation has beneficial effects on both types of processing. When people completed a self-affirmation manipulation before reading information regarding a health-related risk that was personally relevant to them, self-affirmation increased

negative affect about the risk among highly defensive people, while negative affect was decreased among nondefensive people, thereby indicating that self-affirmation may lead to more optimal and adaptive affective responses to risk (Griffin & Harris, 2011). Furthermore, research has indicated that maladaptive responses to climate change that have been suggested to stem from affective processes are reduced through self-affirmation; self-affirmation has been demonstrated to increase perceived self-efficacy with regard to mitigating climate change consequences (Van Prooijen & Sparks, 2012; Chapter 4) and to reduce the minimization of self-involvement in climate change (Sparks, Jessop, Chapman, & Holmes, 2010).

However, although the belief in the ability to influence threatening outcomes is essential to stimulate precautionary action (Homburg & Stolberg, 2006; Stern, 2000), no constructive effects of self-affirmation on pro-environmental intentions to adapt behaviour have been found among people with more sceptical environmental beliefs (Van Prooijen et al., in press; Chapter 3). For example, despite promoting greater acceptance of counterattitudinal climate change information, self-affirmation did not increase the acceptance of the personal implications of climate change with regard to adjusting behaviour to reduce carbon footprint (Van Prooijen & Sparks, 2012; Chapter 4). One potential explanation for these findings might be that self-affirmation motivates people to process climate change information at an abstract construal level, thereby increasing the cognitive perceptions of climate change risk, but does not necessarily enhance the affective processing of climate change risk information. This may lead to a discrepancy between the cognitive evaluation and the emotional evaluation of climate change risks, which, according to the risk as feelings hypothesis, can consequently lead to responses that are dominated by the emotional risk evaluation rather than the cognitive evaluation (Loewenstein et al., 2001). Future research could compare the

effects of self-affirmation on both analytical and affective processing to investigate how they may influence pro-environmental intentions. Alternatively, it could be examined whether a visual, more vivid presentation of climate change consequences rather than describing these consequences in a message after completing a self-affirmation manipulation could stimulate affective processing.

### **Self-affirmation effects on behavioural change**

In order to avoid severe disruption to society over the coming few decades, it is essential that people take action to mitigate climate change consequences (IPCC, 2007a; Stern, 2006). Although the reported research in this thesis has provided insights on the effects of self-affirmation on responses towards climate change, I did not examine whether these effects translate to adopting actual pro-environmental behaviour to reduce individual carbon emissions. However, there is evidence that self-affirmation can affect subsequent behaviour. In the health-risk domain, affirmed people have been shown to be more likely to engage in behaviour that reflects intentions to take precautionary action than nonaffirmed people after reading threatening information about relevant health-risks, such as requesting a sample of sunscreen (Jessop et al., 2009), completing an online diabetes-risk test (Van Koningsbruggen & Das, 2009), and the purchasing of condoms (Sherman et al., 2000). Furthermore, self-affirmation can lead to longer lasting effects on actual health-behaviour; Epton and Harris (2008) have found a significant increase in the consumption of fruit and vegetables over a 7-day period following an experimental self-affirmation manipulation. Behavioural effects of self-affirmation have also been found in other domains; self-affirmation can produce beneficial effects on performance among negatively stereotyped people (Cohen, Garcia, Apfel, & Master, 2006; Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski, 2009). For example, Cook, Purdie-Vaughns, Garcia, and Cohen (2012) conducted a longitudinal study that

demonstrated that African American adolescents often experienced a reduced sense of belonging during middle school, which in turn negatively affected performance. However, self-affirmation stabilized a sense of belonging and increased performance over a 2 year period.

A key determinant of behavioural change is the strength of the intention to adapt ones behaviour (Ajzen, 1991). Despite the positive effect of self-affirmation on the acceptance of anthropogenic climate change information (Van Prooijen & Sparks, 2012; Chapter 4), I did not find evidence in the reported research of this thesis that people with sceptical environmental beliefs had greater intentions to reduce their carbon emissions after being affirmed. Whereas I focused on intentions to conduct more pro-environmentally friendly behaviour in general, future research might target more specific behaviours and include information on how to achieve the behavioural change. It is possible that affirmed people are willing to adopt pro-environmental behaviour, but either do not know how to apply the behavioural change or believe that the intention to generally reduce individual carbon emissions will substantially affect their lifestyle (Kaplan, 2000). In line with this last argument, I found that in the absence of persuasive threatening climate change information, affirmed participants with sceptical environmental beliefs reported higher perceived required effort to reduce carbon footprint than did their nonaffirmed counterparts (Van Prooijen et al., in press; Chapter 3). By focusing on one specific behaviour, the assumption that adopting pro-environmentally friendly behaviour will entail significant sacrifice of a satisfying lifestyle might be reduced, which in turn could produce beneficial effects of self-affirmation on intentions to change behaviour. However, it should be considered that adopting one specific pro-environmental action does not necessarily increase the motivation to adopt other pro-environmental behaviours (Thøgersen & Crompton, 2009;

Thøgersen & Ölander, 2003). Future research could examine whether potential effects of self-affirmation on pro-environmental intentions and subsequent behaviour are limited to the targeted pro-environmental behaviour in the information, or whether these effects are transferred to other behaviours.

### **The current thesis**

#### **Overview**

In the current introductory overview I have placed a strong emphasis on the psychology of defensive responses towards climate change, while using the self-affirmation theory as a framework. However, to avoid a high level of overlap between the introductory overview and the empirical chapters that follow, the empirical chapters focus more strongly on self-affirmation theory and its application to climate change threat. Although many studies have demonstrated that self-affirmation can have beneficial effects on defensiveness towards various threats (see Sherman & Cohen, 2006), few studies have examined whether affirming self-worth can induce more openness to climate change, which presents a multifaceted, collective threat that is relatively intangible and uncertain for most people. Whereas it has been established how climate change can represent a severe threat to human welfare (IPCC, 2007b), it is not clear how climate change may pose a threat to the positive image of the self. The main objectives of the current thesis were to examine whether self-image concerns can evoke resistance towards climate change, and whether self-affirmation can promote more adaptive and open responses to climate change information. Furthermore, I tried to establish how differentially polarized environmental beliefs may influence self-affirmation effects. The studies reported in this thesis are presented in their chronological order .

In Chapter 2 I present three studies addressing self-affirmation effects on



sceptical responses to climate change information. The studies were built on previous research, which demonstrated that affirmed people reported lower levels of climate change scepticism after reading climate change information than did nonaffirmed people (Sparks et al., 2010). In contrast to previous findings, however, Study 1 showed that affirmed participants reported higher levels of scepticism about climate change than did nonaffirmed participants. The purpose of Study 2 was to explain this discrepancy in findings by including prior levels of rejection of environmental problems as a moderator. In Study 3 a similar design as in Study 2 was used, but the self-affirmation manipulation was adapted. Yet, in both latter studies no effects of self-affirmation on scepticism towards climate change information were found. Prior levels of rejection of environmental problems did predict climate change scepticism in either study: Higher levels of rejection were associated with more climate change scepticism.

As the studies conducted in Chapter 2 showed that initial environmental beliefs were a strong indicator of the acceptance of climate change information, I was interested in examining the effects of self-affirmation on initial environmental beliefs when no persuasive threatening information about climate change was introduced to challenge these established opinions. I thereby also extended the self-affirmation literature, as most studies tend to use a persuasive threatening message to test self-affirmation effects. Findings showed that self-affirmation resulted in more pro-environmental motives among participants with positive ecological worldviews but led to less pro-environmental motives among participants with negative ecological worldviews. These findings suggest that in the absence of a persuasive threatening message, self-affirmation might serve to validate a person's initial worldviews about environmental issues.

In Chapter 4, I examined whether self-affirmation might increase the acceptance

of information about potential climate change consequences. Research has indicated that, despite the various severe global problems they can involve, climate change consequences are often underestimated (Leiserowitz, 2005; Weber, 2006). Although self-affirmation has been shown to lead to greater acceptance of health-related risk information (Harris & Napper, 2005; Sherman et al., 2000), little is known about self-affirmation effects on the acceptance of information that focuses on a multifaceted collective threat that is climate change. My findings demonstrated that, among initially sceptical participants, self-affirmation increased risk perceptions of global and national climate change consequences and promoted stronger beliefs that personal efforts to reduce climate change consequences can be effective. Among less sceptical participants, self-affirmation reduced pessimism about the climate change information.

Whereas Chapter 4 provides novel insights into the effects of self-affirmation on the acceptance of the risks of a collective threat, Chapter 5 builds on the literature suggesting that group-affirmation can be a more effective strategy than self-affirmation to reduce defensiveness towards collective threats among people who highly identify with the group that is threatened (Derks et al., 2011; Derks et al., 2009; Sherman et al., 2007). However, while these studies focused on defensive biases towards collective performance-related threats, my study focused on a collective threat to group morality, as climate change is often perceived to be a moral issue (Lorenzoni & Pidgeon, 2006). Results showed that self-affirmation promoted more acceptance of the contribution of the UK to climate change problems than did group-affirmation among participants with high national identification and negative ecological worldviews. These findings indicate that it might be important to distinguish whether a collective threat is related to morality or competence characteristics of the ingroup in order to predict the effectiveness of group-affirmation in comparison to self-affirmation among highly identified group

members.

## **Implications**

Prior environmental beliefs have been shown to lead to biases in the processing of climate change information, in which the information tends to be interpreted in the context of existing beliefs (Corner et al., 2012; Whitmarsh, 2011). Yet, little research has explored whether these biased responses to climate change information can be attenuated. In contrast, self-affirmation research has repeatedly demonstrated that defensive responses to potentially threatening information can be reduced by reflecting on important values (Sherman & Cohen, 2006). However, self-affirmation theory has rarely been applied to climate change, which presents a unique and multifaceted threat to the lives and livelihoods of countless people in present and future generations (IPCC, 2007b). The research in the current thesis provides a novel approach to both fields of research, as it is the first to examine how previous environmental beliefs are influenced by self-affirmation manipulations. Results showed that self-affirmation can decrease the impact of prior environmental beliefs on the processing of climate change information, which resulted in greater message acceptance among people who were initially sceptical towards the information (Van Prooijen & Sparks, 2012; Chapter 4; Chapter 5). It is important to note, however, that in the absence of explicit information about climate change, self-affirmation led to an accentuation of prior environmental beliefs (Van Prooijen et al., in press; Chapter 3). These findings suggest that self-affirmation promotes more open-mindedness in situations where prior beliefs are challenged by explicit information.

The implications of the findings in the current thesis for communication about climate change are twofold. First, campaigns promoting the necessity of reducing carbon footprints might benefit from exploring the options to include self-affirmation

interventions in these campaigns in order to reduce the rejection of the presented information. The rejection of information about climate change can diminish the willingness to address environmental problems and therefore constitutes a barrier to behavioural change (Gifford, 2011; Lorenzoni, Nicholson-Cole, & Whitmarsh, 2007; O'Connor, Bord, & Fisher, 1999). Findings in the current thesis indicate that a self-affirmation manipulation prior to the presentation of climate change information can increase pro-environmental motives and perceptions of both self- and group-efficacy with regard to mitigating climate change consequences (Van Prooijen & Sparks, 2012; Chapter 4; Chapter 5), which are determinants of behaviour (Ajzen, 1991; Homburg & Stolberg, 2006). Research has recently started to focus on the impact of brief self-affirmation manipulations, which might be more suitable for implementation in practical interventions than the standard self-affirmation manipulations. Results showed that a brief self-affirmation manipulation was equally effective as the standard self-affirmation manipulation (Armitage, Harris, & Arden, 2011).

Second, it is important to raise awareness that information about climate change can unintentionally present a threat to the positive self-image, which in turn can result in sceptical responses to environmental campaigns. The current thesis shows that reducing self-image concerns through affirming the self can attenuate maladaptive responses to anthropogenic climate change information. Effectiveness of environmental campaigns might be enhanced by examining whether information that focuses on the benefits of a pro-environmental lifestyle rather than on the negative consequences of current lifestyles can prevent the occurrence of the rejection of climate change information.

### **Limitations**

The current thesis has several limitations that need to be addressed. One potential limitation is that the values that were used to affirm participants in the current

thesis were primarily self-transcendence values (Chapter 2, Chapter 3, and Chapter 4). It can therefore be argued that the effects that were found in the current thesis emerged due to priming self-transcendence aspects of the identity rather than self-affirmation. However, some of the results that were reported in the current thesis suggest that this alternative explanation is unlikely. First, in the absence of threatening persuasive information, affirming self-transcendence values resulted in *less* pro-environmental motives among participants with negative ecological worldviews (Van Prooijen et al., in press; Chapter 3). Self-transcendence values have repeatedly been associated with stronger pro-environmental motives (De Groot & Steg, 2010; Evans et al., 2012; Gärling, 1999). Priming self-transcendence values is therefore likely to enhance pro-environmental motives, which contradicts the suggestion that priming effects can explain these findings. Second, the self-affirmation manipulation used in Chapter 5 focused on self-enhancement qualities rather than self-transcendence qualities (Čehajić-Clancy, Effron, Halperin, Liberman, & Ross, 2011). The affirmation of self-enhancement qualities, which was less relevant to the presented information about climate change, resulted in effects that were congruent with the effects found when self-transcendence values were affirmed. Nevertheless, it is important for future research to examine whether the affirmation of different values can lead to different outcomes.

In the current thesis the underlying processes that may determine the effects of self-affirmation were not explicitly examined. Self-affirmation literature has suggested potential mediators that might clarify what drives self-affirmation effects, such as other-directed feelings (Crocker et al., 2008). However, although the inclusion of mediator measures could provide interesting insights into the underlying processes of self-affirmation, I made the careful decision not to measure potential mediators in order to avoid direct effects of mediator measurement on the outcome variables. The

measurement of a potential mediating process in itself can interfere with the effect of interest, such that mediator measurement can either induce or prevent the process from occurring (Spencer, Zanna, & Fong, 2005). Additionally, only the first study that is reported in the current thesis (Chapter 2) included manipulation checks, while the self-affirmation manipulations used in the remaining studies were not checked. It has been argued that the inclusion of manipulation checks may unintentionally affirm self-integrity, which would thereby contaminate the participants in the control condition (McQueen & Klein, 2006). Results of Study 1 (Chapter 2) showed that the inclusion of the selected manipulation check measures, in which self-feelings, mood, and self-perceived level of kindness were assessed, were not sufficient to self-affirm participants in the control condition. Yet, the self-affirmation manipulation also did not yield significant effects on the selected manipulation check measures, which indicates that the selected manipulation check measures could not explain which mechanisms may underlie self-affirmation effects. Furthermore, whereas the selected manipulation check measures in Study 1 (Chapter 2) did not contaminate participants in the control condition, it cannot be assumed that other forms of manipulation check measures will also not unintentionally self-affirm participants in the control condition.

Another limitation of the current thesis that needs to be acknowledged is that the samples used in all studies consisted exclusively of students, which is a common problem within many psychology studies due to, for example, practical constraints in terms of resources. Additionally, participants were sequentially assigned to the experimental conditions in all studies reported in the current thesis. Random allocation of the participants would have served as a better safeguard against potential biases in the distribution of participants over the experimental conditions.

Most of the measures used in the current thesis were not counterbalanced in

order to avoid the development of item-wording factors within the measures (Schriesheim & Eisenbach, 1995). However, this also reduced the control over unwanted effects such as practice responses. Furthermore, no behavioural measures were included in the current thesis. The potential effects of self-affirmation on pro-environmental actions presents an important direction to pursue for future research.

Finally, no statistical power analyses were conducted. It is likely that Study 2 and Study 3 (Chapter 2) were low in power due to relatively small sample sizes, which might explain the lack of significant effects of the self-affirmation manipulation within these studies. A power analysis would have provided insights into whether the conducted statistical tests had an adequate sensitivity to detect existing effects, which may have clarified if no self-affirmation effects were found due to the low power in the studies, or if the self-affirmation manipulation was ineffective.

## CHAPTER 2

### Climate Change Scepticism



Although awareness about climate change is relatively high amongst the general public in the United Kingdom, many people are still ambivalent about the causes and the severity of climate change (Downing & Ballantyne, 2007). The problem of climate change is often minimized, and the tendency to reject information on this topic is quite common (Dickinson, 2009). This rejection, which might partially stem from feelings of anxiety and insecurity that are evoked by the threat of climate change (Koole & Van den Berg, 2005; Loewenstein, Weber, Hsee, & Welch, 2001; Pyszczynski, Greenberg, & Solomon, 1999), can not only prevent people from protecting the environment but it can ultimately even lead to an increase in materialism, consumerism, and other behaviours that can be detrimental to the environment (Kasser & Sheldon, 2000; Sheldon & Kasser, 2008). Thus, it is important to learn how to overcome these initial responses to threatening environmental information in order to increase the awareness of the severity of climate change problems.

In this research I investigated whether self-affirmation theory (Steele, 1988) can be a helpful tool in attenuating scepticism about the reality of climate change. Steele proposed that people strive to maintain a positive image of the self as being “adaptively and morally adequate” (p. 262). When this image is threatened, people can respond defensively by, for example, downplaying or avoiding the threatening information in order to reduce the threat. However, self-affirmation theory predicts that the effect of these self-threats can be eliminated by affirming a valued aspect of the self-identity, which reconstructs a positive global image of the self. The threat to global self-integrity should then be lowered and therefore be more tolerable, which should reduce the need to respond defensively to threatening information.

Ever since Steele proposed his self-affirmation theory (1988), much research has reported beneficial effects of self-affirmation in terms of reducing biased processing of

threatening information. For instance, Cohen, Aronson, and Steele (2000) examined self-affirmation effects on responses to information that contained disconfirming evidence about cherished beliefs. Participants were proponents and opponents of capital punishment, who were asked to read counterattitudinal information regarding the death penalty. Findings revealed that affirmed participants responded more favourably to the counterattitudinal information and were more likely to adapt their attitudes accordingly than nonaffirmed participants.

Another example of attenuating defensiveness towards threatening information through self-affirmation was reported by Sherman, Nelson, and Steele (2000), who examined defensive responses to information regarding risk of developing breast cancer. Women (coffee-drinkers vs. non-coffee-drinkers) were given an article that described research that linked caffeine intake to fibrocystic disease, a precursor to breast cancer. Within the nonaffirmed control condition, coffee-drinking women were more resistant to the information than non-coffee-drinking women. These results support earlier findings that the personal relevance of threatening information is an important determinant of the rejection of such information (Lieberman & Chaiken, 1992). However, findings also showed that the self-affirmation manipulation reversed these responses. Not only did affirmed coffee-drinking women report more acceptance of the information than did nonaffirmed coffee-drinking women, the affirmed coffee-drinking women were also more accepting of the information than were affirmed non-coffee-drinking women.

Self affirmation theory has been applied successfully to a range of domains that address attitude and behavioural change, and has been shown, for example, to promote health-related behaviours (e.g. Harris & Napper, 2005; Jessop, Simmonds, & Sparks, 2009; Sherman et al., 2000), and to reduce prejudice (Fein & Spencer, 1997). However,

self-affirmation theory has rarely been applied to the domain of pro-environmental attitudes. Research that has shown promising results on this topic was reported by Sparks, Jessop, Chapman, and Holmes (2010). In their first study participants completed a kindness-affirmation task (Reed & Aspinwall, 1998) and were asked to read a threatening message about climate change. The self-affirmation manipulation resulted in a decrease in both general scepticism about climate change and the minimization of self-involvement in environmental outcomes.

## **Overview**

The current research expands on the studies conducted by Sparks et al. (2010) by examining whether self-affirmation can attenuate scepticism about the reality of climate change, and how previous levels of rejection of environmental problems may moderate these effects. Three studies were conducted. In Study 1, I set out to replicate and extend the findings of Sparks et al. by assessing the effects of a kindness-affirmation on scepticism about climate change and commitment to protect the environment. The aim of Study 2 was to address whether prior beliefs regarding the rejection of environmental problems can moderate kindness-affirmation effects on scepticism about climate change and message derogation. In Study 3 it was examined whether the results of Study 1 and 2 could be replicated using a different self-affirmation manipulation. A value-affirmation manipulation was used, in which participants were asked to write a short statement about a value that was important to them.

## **Study 1**

The aims of Study 1 were threefold. First, I aimed to replicate the findings of Sparks et al. (2010), which showed that a kindness-affirmation reduced climate change scepticism. In the current study the effects of a kindness-affirmation on scepticism

about climate change were assessed using an established measure of climate change scepticism developed by Whitmarsh (2011). Second, I assessed whether a kindness-affirmation could influence commitment to protect the environment. Whereas lower levels of scepticism about climate change may indicate more general acceptance of climate change information, it does not inform us about how perceptions of the personal implications of climate change are shaped by such information. Assessing commitment to protect the environment allows us to investigate if the personal implications of the climate change information are accepted. Third, I examined whether the inclusion of manipulation checks would affect the responses on other outcome measures. Most self-affirmation studies have not included manipulation checks because this procedure might cause an unintended affirmation among the nonaffirmed control group (McQueen & Klein, 2006). In Study 1 half of the participants completed manipulation checks in order to explore whether these contamination effects actually occur, and how a kindness-affirmation may influence self-feelings, mood, and self-perceived levels of kindness. I expected that a kindness-affirmation would promote less scepticism about climate change and more commitment to the environment.

## **Method**

**Participants.** Eighty (61 female; 19 male) students from a UK university took part in the study for either course credit or a monetary reward. The age of the participants ranged from 18 years to 65 years ( $M = 22.05$ ,  $SD = 6.13$ ).

**Design and procedure.** The hypotheses were tested in a 2 (kindness-affirmation: affirmation vs. control) by 2 (manipulation checks: manipulation checks included vs. manipulation checks excluded) design. University students were recruited in various areas at campus, and asked if they were willing to fill in a questionnaire. Participants were sequentially assigned to one of the four conditions.

### **Materials.**

***Kindness-affirmation manipulation.*** The participants started with a short checklist that was claimed, depending on the affirmation condition, to measure the level of kindness towards others, or personal opinions. The affirmation condition was based on the self-affirmation manipulation of Reed and Aspinwall (1998), which presented the participants with 10 items that focused on relatively small and common acts of kindness (“Have you ever been concerned with the happiness of another person?”; “Have you ever tried not to hurt the feelings of another person?” (Yes/ No). Participants were requested to give an example for each item. It was expected that most participants would be able to agree with all the items in the checklist, which in turn would serve as an affirmation. In the control condition, participants completed 10 items that were unrelated to kindness and instead focused on general opinions (“I think that chocolate is the best flavour for ice cream”; “I think that winter is the most satisfying season during the year” (Yes/ No). Participants were asked to provide a reason for their opinions.

***Climate change information.*** After the completion of the checklist, a leaflet was presented to the participants that contained information about climate change. The information consisted of six short paragraphs of quoted passages taken from different media sources and books (Sparks et al., 2010). An example of a passage is: ‘So asking wealthy people in the rich nations to act to prevent climate change means asking them to give up many of the things they value - their high performance cars, their flights to Tuscany and Thailand and Florida - for the benefit of other people... The problem is compounded by the fact that the connection between cause and effect seems so improbable. By turning on the lights, filling the kettle, taking the children to school, driving to the shops, we are condemning other people to death. We never choose to do this. We do not see ourselves as killers. We perform these acts without passion or intent

(Monbiot, 2006)’. Each paragraph was followed by a question about the text in order to check that participants had read the information thoroughly.

**Manipulation checks.** When participants finished reading the climate change information the experimental manipulation was checked. Single item measures (adapted from Sherman et al., 2000) assessed self-feelings (“How do you feel about yourself right now?”, *extremely negative* [1] to *extremely positive* [7]), mood (“How would you describe your mood right now?”, *extremely bad mood* [1] to *extremely good mood* [7]), and self-perceived level of kindness (“How kind do you consider yourself to be?”, *not at all kind* [1] to *extremely kind* [9]).

The participants in the ‘manipulation checks excluded’ condition completed the dependent measures directly after they finished reading the climate change information. All dependent measures items were assessed on a Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

**Climate change scepticism.** The thirteen-item climate change scepticism scale developed by Whitmarsh (2011) was used to measure scepticism about climate change (e.g., “Claims that human activities are changing the climate are exaggerated”,  $\alpha = .93$ ).

**Commitment.** A six-item measure was developed to assess commitment to protect the environment (“I feel a strong commitment to being environmentally conscious”;  $\alpha = .88$ ).

## Results

**Manipulation checks.** A MANOVA revealed that there was no significant effect of kindness-affirmation on the manipulation checks,  $F(4, 35) = .18, p = .95$ . There was a general pattern that participants in the affirmation condition were more negative than participants in the control condition (see Table 1).

All dependent measures were subjected to a 2 (kindness-affirmation: affirmation vs. control) by 2 (manipulation checks: manipulation checks included vs. manipulation checks excluded) ANOVA.

***Climate change scepticism.*** The analysis revealed a significant main effect of kindness-affirmation on scepticism about climate change,  $F(1,76) = 4.63$ ,  $p = .03$ , partial  $\eta^2 = .06$ . In contrast to my hypothesis, participants in the affirmation condition were *more* sceptical about climate change ( $M = 3.44$ ,  $SD = 1.24$ ) than participants in the control condition ( $M = 2.86$ ,  $SD = 1.14$ ). No main effect of manipulation checks on scepticism about climate change was found,  $F(1,76) = .62$ ,  $p = .44$ , partial  $\eta^2 = .008$ , nor did manipulation checks interact with kindness-affirmation,  $F(1,76) = .07$ ,  $p = .79$ , partial  $\eta^2 = .001$ .

***Commitment.*** There was no significant difference in reported commitment to protect the environment between participants in the affirmation condition ( $M = 4.67$ ,  $SD = 1.24$ ) and participants in the control condition ( $M = 5.09$ ,  $SD = 1.20$ ),  $F(1,76) = 2.30$ ,  $p = .14$ , partial  $\eta^2 = .03$ . Manipulation checks did not have a main effect on commitment,  $F(1,76) = .30$ ,  $p = .59$ , partial  $\eta^2 = .004$ , nor did manipulation checks interact with kindness-affirmation,  $F(1,76) = .41$ ,  $p = .53$ , partial  $\eta^2 = .005$ .

## Discussion

In the study conducted by Sparks et al. (2010) it was found that a kindness-affirmation reduced climate change scepticism. In contrast to my hypothesis, the results of Study 1 revealed that a kindness-affirmation significantly *increased* scepticism about climate change. This finding suggests that affirming the self-concept might lead to backfire-effects on scepticism towards environmental problems (i.e. an increase rather than a decrease in defensiveness towards potentially threatening information; see

Sherman & Cohen, 2006). Self-affirmation did not significantly influence commitment to protect the environment.

Furthermore, in Study 1 I examined whether the inclusion of manipulation checks could confound self-affirmation effects on the outcome measures by causing an unintended affirmation in the control condition (McQueen & Klein, 2006). The inclusion of manipulation checks did not contaminate the effects of the kindness-affirmation manipulation on scepticism about climate change or commitment to protect the environment, which indicates that asking participants about their self-feelings, mood, and self-perceived levels of kindness with single items was not sufficient to affirm self-worth. Additionally, whereas Sherman et al. (2000) found that self-affirmation led to more positive self-feelings but did not affect mood, the current study showed no significant effects of kindness-affirmation on any of the manipulation checks. It should be noted, however, that participants in the study of Sherman et al. completed the affirmation manipulation (and the subsequent manipulation checks) after reading threatening information, while in the current study participants completed the affirmation manipulation before reading the climate change information, and the manipulation checks were assessed after the information was presented. The potential effects of the affirmation manipulation on self-feelings, mood, and self-perceived levels of kindness may therefore have been altered by the content of the information that was read in this Study. I suspect that the discrepancy between the positive self-feelings that may have been evoked by the affirmation manipulation and the negative content of the information could have eliminated any effect on the manipulation checks.

## **Study 2**

Contrary to common findings in self-affirmation literature that show a reduction in defensiveness towards threatening information through self-affirmation (Cohen et al.,



2000; Sherman et al., 2000; Sparks et al., 2010), the results of Study 1 showed an opposite effect where kindness-affirmation increased scepticism about climate change. In Study 2 I sought to explain this difference in effects by exploring whether prior levels of rejection of environmental problems can moderate the impact of kindness-affirmation on responses to climate change information. A measure of message derogation was included as an additional indicator of scepticism towards the climate change information. Affirmed people have been shown to be more open to counterattitudinal arguments while being more critical of arguments supporting proattitudinal views (Correll, Spencer, & Zanna, 2004). It might be that affirmed people with low levels of rejection of environmental problems will be less persuaded by the climate change information due to a more critical examination of the presented proattitudinal arguments. The climate change information that was provided to participants in Study 1 and in the study conducted by Sparks et al. (2010) focused on the personal opinions about climate change of politicians and writers rather than on scientific facts, which is therefore likely to be perceived as less objective and reliable. These weaker arguments could in turn result in stronger scepticism about climate change and more message derogation among affirmed people with low levels of rejection of environmental problems. In contrast, affirmed people with high levels of rejection of environmental problems may be more open to the counterattitudinal arguments presented in the information, which may result in a reduction in scepticism about climate change and less message derogation.

However, it may be argued that the kindness-affirmation manipulation used in Study 1 is in a domain related to the threat that the information may present. The relevance of the kindness-affirmation to the self-threat might highlight a personal standard that was violated, which has previously been shown to enhance defensiveness

and the need for self-justification (Aronson, Blanton, & Cooper, 1995; Blanton, Cooper, Skurnik, & Aronson, 1997; Sivanathan, Molden, Galinsky, & Ku, 2008). Climate change information that describes both the detrimental impact of climate change on humanity and how the lack of pro-environmental behaviour increases the severity of these consequences may be more threatening to people who tend to reject environmental problems, who might be less engaged in pro-environmental behaviour in their daily life than people who do not reject environmental problems. They may therefore experience stronger dissonance when reading this information after completing a kindness-affirmation than do people with low levels of rejection of environmental problems, which in turn may lead to a backfire-effect of the kindness-affirmation. Based on this explanation it can alternatively be hypothesized that kindness-affirmation will lead to more scepticism about climate change among people with high levels of rejection of environmental problems, while it will lead to less scepticism about climate change among people with low levels of rejection of environmental problems.

## **Method**

**Participants.** Forty-five (40 female; 5 male) students from a UK university took part in the study in return for course credit. The age of the participants ranged from 17 years to 24 years ( $M = 18.89$ ,  $SD = 1.70$ ).

**Design and procedure.** One week after the rejection of environmental problems measure was administered, participants were asked to complete a questionnaire that contained the kindness-affirmation manipulation, the climate change information, and the outcome measures. Both parts of the study could be completed either using a paper and pencil questionnaire or online. Participants were sequentially assigned to the affirmation or to the control condition.

## **Materials.**

***Rejection of environmental problems.*** The “possibility of an ecological crisis” subscale of the New Ecological Paradigm (NEP; Dunlap, Van Liere, Mertig, & Jones, 2000) was used as an indicator of rejection of environmental problems. This scale consists of three items: “Humans are severely abusing the environment (reversed scored)”, “The so-called “ecological crisis” facing humankind has been greatly exaggerated”, “If things continue on their present course, we will soon experience a major ecological catastrophe (reversed scored)”. The items were presented on a Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), with higher scores reflecting higher levels of rejection of environmental problems ( $\alpha = .79$ ).

***Kindness-affirmation manipulation.*** Both the affirmation and the control condition were identical to the kindness-affirmation manipulation used in Study 1.

***Climate change information.*** The climate change information that was presented to the participants was identical to the information used in Study 1.

The outcome measures were introduced to the participants after the information, and were all measured on a Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

***Climate change scepticism.*** The same scale used in Study 1 served as the climate change scepticism measure ( $\alpha = .91$ ).

***Message derogation.*** Four items (cf. Sparks et al., 2010) assessed message derogation (e.g. “I thought the information about climate change was overblown”,  $\alpha = .82$ ).

## **Results**

***Analytical strategy.*** The outcome measures were analyzed with hierarchical regression analyses. In the first step of the analysis the main effects of kindness-

affirmation (1 = *affirmation* vs. 0 = *control*) and rejection of environmental problems (as a mean-centred continuous variable) were entered. The interaction between kindness-affirmation and rejection of environmental problems was entered at the second step. Means and standard deviations of the outcome measures as a function of kindness-affirmation are presented in Table 2.

***Climate change scepticism.*** Rejection of environmental problems emerged as a significant predictor of climate change scepticism, such that greater rejection of environmental problems was associated with higher levels of scepticism about climate change,  $\beta = .51$ ,  $t = 3.90$ ,  $p < .001$ , semipartial  $R^2 = .26$ . There was no significant effect of kindness-affirmation on climate change scepticism,  $\beta = -.06$ ,  $t = -.47$ ,  $p = .64$ , semipartial  $R^2 = .004$ , nor did kindness-affirmation interact with rejection of environmental problems,  $\beta = .16$ ,  $t = .98$ ,  $p = .33$ , semipartial  $R^2 = .02$ .

***Message derogation.*** A significant main effect of rejection of environmental problems was found, such that greater rejection of environmental problems was associated with higher levels of message derogation,  $\beta = .32$ ,  $t = 2.26$ ,  $p = .03$ , semipartial  $R^2 = .10$ . There was no significant difference between the kindness-affirmation conditions in the reported levels of message derogation,  $\beta = -.19$ ,  $t = -1.35$ ,  $p = .18$ , semipartial  $R^2 = .04$ . No significant interaction between kindness-affirmation and rejection of environmental problems was found,  $\beta = .24$ ,  $t = 1.35$ ,  $p = .18$ , semipartial  $R^2 = .04$ .

## **Discussion**

One of the aims of Study 2 was to examine whether prior levels of rejection of environmental problems moderated the effects of kindness-affirmation on scepticism towards climate change information, and whether this might explain the findings of Study 1, in which it was shown that kindness-affirmation increased rather than

decreased scepticism about climate change. Contrary to both opposing hypotheses, rejection of environmental problems did not interact with kindness-affirmation on the outcome measures and can therefore not account for the difference in findings between Study 1 and the findings from Sparks et al. (2010), who found that kindness affirmation decreased climate change scepticism. Moreover, no effects of kindness-affirmation on scepticism indicators were found. The pattern of results, although not statistically significant, did not suggest any backfire-effects of kindness-affirmation on scepticism about climate change or message derogation. This is in contrast to the findings of Study 1, where self-affirmation led to a backfire-effect on scepticism about climate change. One consistent finding in Study 2 was the predictive power of prior levels of rejection of environmental problems on the outcome measures. It appears that kindness-affirmation could not influence the established beliefs of the participants regarding their scepticism towards climate change.

### **Study 3**

Whereas Study 1 and 2 focused on the effects of a kindness-affirmation, my aim in Study 3 was to examine whether a value-affirmation manipulation would influence scepticism about climate change and message derogation. The most widely used technique to affirm people is to provide a short list of values, from which participants are asked to select the value that is most important to them and to write a few sentences to describe why this value is important to them (McQueen & Klein, 2006). In Study 2 it was found that only prior levels of rejection of environmental problems predicted scepticism about climate change and message derogation, while kindness-affirmation did not affect these outcome measures. A similar design as in Study 2 was used in Study 3 to explore whether the use of a different manipulation in the form of a value-

affirmation could reduce scepticism towards climate change information, and how prior levels of rejection of environmental problems may moderate these effects.

## **Method**

**Participants.** Forty psychology undergraduate students (38 females, 2 males) participated in the study for course credit. The age of the participants ranged from 18 years to 30 years ( $M = 19.08$ ,  $SD = 2.15$ ). Participants were recruited by email, in which the procedure of the study was explained.

**Materials and procedure.** Participants were asked to complete a brief online survey in which rejection of environmental problems was assessed using the same measure as in Study 2 ( $\alpha = .62$ ). One week later the participants were instructed to remain seated after a course lecture in order to complete a second questionnaire, in which participants first completed a value-affirmation manipulation that was adapted from Sherman et al. (2000, Study 2). Twelve different values were presented to all participants (e.g. *forgiveness*, *loyalty*, *honesty*). Participants in the affirmation condition were asked to select the value that was most important to them, and to provide a short statement about why the selected value was important to them. Participants in the control condition were asked to choose their least important value, and to describe why this value might be important to someone else. Participants then read the same climate change information that was used in Study 1, which was followed by the assessment of scepticism about climate change ( $\alpha = .91$ ) and message derogation ( $\alpha = .84$ ) using the same measures as in Study 1 and 2 respectively.

## **Results**

**Analytical strategy.** Hierarchical regression analyses were conducted to analyze the results using the same analytic procedure as in Study 2. Means and standard

deviations of the outcome measures as a function of value-affirmation are presented in Table 3.

***Climate change scepticism.*** Rejection of environmental problems emerged as a significant predictor of climate change scepticism, such that greater rejection of environmental problems was associated with higher levels of scepticism about climate change,  $\beta = .56$ ,  $t = 4.14$ ,  $p < .001$ , semipartial  $R^2 = .31$ . There was no significant difference between the value-affirmation conditions in the reported levels of climate change scepticism,  $\beta = -.14$ ,  $t = -1.01$ ,  $p = .32$ , semipartial  $R^2 = .02$ . Furthermore, no significant interaction between value-affirmation and rejection of environmental problems was found,  $\beta = -.07$ ,  $t = -.35$ ,  $p = .73$ , semipartial  $R^2 = .002$ .

***Message derogation.*** The analysis yielded no significant main effect of value-affirmation,  $\beta = -.05$ ,  $t = -.31$ ,  $p = .76$ , semipartial  $R^2 = .002$ , nor rejection of environmental problems,  $\beta = .25$ ,  $t = 1.60$ ,  $p = .12$ , semipartial  $R^2 = .06$ , on message derogation. The interaction between value-affirmation and rejection of environmental problems was not significant,  $\beta = -.18$ ,  $t = -.72$ ,  $p = .48$ , semipartial  $R^2 = .01$ .

## **Discussion**

In contrast to Study 1 and 2 where a kindness-affirmation manipulation was used, Study 3 focused on the effects of a value-affirmation manipulation on scepticism about climate change and message derogation, and whether these effects were influenced by prior levels of rejection of environmental problems. In line with Study 2, however, I found no effects of the value-affirmation manipulation on the outcome measures. A value-affirmation manipulation did not lead to lower scepticism towards climate change information, which is consistent with the results of Study 2, where no effects of the kindness-affirmation on the outcome measures were found. Previous research has indicated that the effects of value-affirmation and kindness-affirmation

manipulations appear to be similar (Armitage & Rowe, 2011; Jessop et al., 2009). My findings in Study 2 and 3 support these results. Furthermore, rejection of environmental problems was a predictor of scepticism about climate change, but did not significantly predict message derogation.

### **General Discussion**

In this research I aimed to examine the effects of self-affirmation on scepticism towards climate change information. Whereas self-affirmation has repeatedly been shown to decrease defensiveness towards potentially threatening information (Cohen et al., 2000; Sherman et al., 2000; Sparks et al., 2010), the results of Study 1 demonstrated that self-affirmation led to *higher* scepticism about climate change. The goal of Study 2 was to replicate this finding, and to explore whether prior levels of rejection of environmental problems could moderate self-affirmation effects. However, no effect of self-affirmation was found on either scepticism about climate change or on message derogation. These indicators of scepticism towards climate change information were only influenced by prior levels of rejection of environmental problems, where more rejection of environmental problems was associated with more scepticism towards climate change information. While a kindness-affirmation manipulation was used in Study 1 and Study 2, Study 3 explored the effects of a value-affirmation manipulation on scepticism towards climate change information. In line with Study 2, self-affirmation had no influence on scepticism towards climate change. Prior levels of rejection of environmental problems did predict scepticism about climate change, such that more rejection of environmental problems was associated with more scepticism about climate change. These results indicate that scepticism towards climate change information was strongly dependent on prior levels of rejection of environmental problems, and that self-



affirmation could not effectively influence these initial responses to climate change information.

The findings that self-affirmation either had no effect (Study 2 and 3) or a detrimental effect (Study 1) on climate change scepticism are in contrast to the findings of Sparks et al. (2010), which illustrated a reduction of climate change scepticism through self-affirmation. It can only be speculated as to why there is a lack of consistency in these findings. A difference that may have had an impact on the inconsistency in findings between the studies is the different measure that was used to assess climate change scepticism. It would have been beneficial to include the scepticism measure used by Sparks et al. in this research to examine whether these measures may have led to different self-affirmation effects. It should be noted, however, that there was a similarity between certain items within both measures. For this reason I suspect that it is unlikely that the difference in climate change scepticism measures could explain the contradictory findings. Another explanation is that the different effects may potentially stem from the different use of the kindness-affirmation manipulation. Whereas I have used the original 10-item manipulation (Reed & Aspinwall, 1998), Sparks et al. adapted the manipulation to a shorter 5-item version due to time constraints for the participants. It might be that retrieving 5 small acts of kindness is easier for people than retrieving 10 small acts of kindness, which may therefore create a more effective self-affirmation. Reed and Aspinwall found that their kindness-affirmation manipulation decreased biased processing of health-risk information, thereby reflecting the effectiveness of the 10-item manipulation. However, the manipulation may have distinctive effects when it is applied to an environmental threat. It is important that more research is done to explain why these findings might be mixed.

Despite the vast amount of literature available on self-affirmation effects on responses to threatening information (see Sherman & Cohen, 2006), little is known about how affirming self-integrity may affect environmental beliefs. The current research has shown inconsistent findings on the effectiveness of self-affirmation on climate change scepticism, thereby indicating that further research is merited to explore if self-affirmation effects in the environmental domain may resemble or differ from self-affirmation effects in different domains. It should be considered that climate change might represent a different type of threat than has previously been examined in self-affirmation literature, as it appears to be a multifaceted, collective threat that is relatively familiar to most people due to the media coverage on this topic. This increased awareness and confrontation with climate change may affect the development of more chronically activated defensive responses, which in turn may determine the effectiveness of self-affirmation (Harris & Epton, 2010; Sherman & Cohen, 2006).

Table 1

*Study 1: Means and standard deviations of manipulation checks as a function of kindness-affirmation*

	Affirmation		Control	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Self-feelings	4.85	1.27	5.05	1.19
Mood	4.90	1.33	5.20	1.06
Kindness	6.75	1.16	6.85	1.23

Table 2

*Study 2: Means and standard deviations of outcome measures as a function of kindness-affirmation*

	Affirmation		Control	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Climate change scepticism	2.90	1.29	3.07	0.92
Message derogation	3.16	1.26	3.65	1.12

Table 3

*Study 3: Means and standard deviations of outcome measures as a function of value-affirmation*

	Affirmation		Control	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Climate change scepticism	3.03	0.94	3.37	1.10
Message derogation	3.56	1.20	3.70	1.01

## CHAPTER 3

### Accentuating Ecological Worldviews

This chapter was adapted from Van Prooijen, Sparks, and Jessop (in press). The first author was the principal investigator for the current research. The second author provided suggestions regarding the design of the experiment and commented on the manuscript, whereas the third author provided advice on procedures to probe two-way interactions in hierarchical regression analyses and commented on the manuscript.

Research has repeatedly shown that people strive to maintain a positive image of the self, and are motivated to protect this image whenever it is threatened (e.g., Sherman & Cohen, 2006). In daily life it is impossible to avoid encounters with self-threats, which can include information that challenges cherished beliefs, scientific results pointing out health risks, performance evaluations, personality feedback, and so on. People often respond defensively by avoiding, dismissing, or denying a threat in order to maintain a sense of self-worth (Kunda, 1987; Lord, Ross, & Lepper, 1979), thereby depriving themselves of the opportunity to learn from potentially useful information. According to self-affirmation theory, this defensiveness can be reduced through affirming a valued aspect of the self (Steele, 1988). It suggests that reflecting on important personal values affirms a sense of self-integrity, which in turn provides a buffer to self-threats and enables individuals to respond to self-threats in a more open and adaptive manner.

As a result of the focus of self-affirmation theory on the responses to information that threatens self-integrity, the majority of research tends to examine self-affirmation effects using a threatening persuasive message. Self-affirmation has been shown to produce a range of beneficial effects in these persuasive contexts, such as less defensive processing of threatening messages (Harris & Napper, 2005; Sherman, Nelson, & Steele, 2000), stronger intentions to adapt behaviour (Harris & Napper, 2005; Sherman et al., 2000), and more openness to self-improvement (Crocker, Niiya, & Mischkowski, 2008). In comparison, little is known about the effects of self-affirmation when people are not presented with explicit threatening information; that is, in situations where people need to rely on their existing cognitions about the topic at hand. In the present study, I aimed to extend self-affirmation research by investigating whether self-affirmation in the absence of a threatening persuasive message can lead to a validation of a person's initial worldviews.

According to the self-validation hypothesis (Petty & Briñol, 2008; Petty, Briñol, & Tormala, 2002), one determinant of the extent of persuasion effects is the level of confidence that people have in their own thoughts, which in turn can increase both reliance on these thoughts to underpin opinions and beliefs in the validity of these judgments. Briñol, Petty, Gallardo, and DeMarree (2007) have shown that self-affirmation can enhance people's self-confidence in their thoughts in a nonthreatening persuasive context: When people were affirmed after reading a persuasive message about a new consumer product, self-affirmation increased self-confidence in the validity of thoughts regarding the message. However, it has not been examined how affirming self-worth may influence responses to familiar threats in a nonpersuasive context. The present study will address this issue by focusing on the effects of self-affirmation on established beliefs about an ongoing environmental threat.

Surprisingly, research has only recently started to focus on the potential effectiveness of self-affirmation as an intervention device to influence pro-environmental motivation (Sparks, Jessop, Chapman, & Holmes, 2010). Despite scientific evidence about the human contribution to climate change and the catastrophic consequences humans are likely to face (IPCC, 2007a), people often tend to downplay climate change and reject information on this topic (Dickinson, 2009). Due to the urgency of these environmental problems, I believe that the application of self-affirmation theory to the psychology of climate change threats merits further research.

The persuasive messages that are presented in self-affirmation research often contain relatively new information about a behaviour-specific, individual threat in order to test how self-affirmation may affect responses to these threats (for reviews, see Harris & Epton, 2010; Sherman & Cohen, 2006). However, these threats appear to be quite different from climate change, which can be considered to be a collective and pervasive



threat that presents an intangible risk for most individuals. Most people in the western world possess a certain amount of background information about climate change and have heard about the dangers that climate change can bring (Reser & Swim, 2011). People are confronted with the severity of climate change and its consequences on a regular basis through the media, and have formed opinions about environmental problems that have become incorporated into their belief systems. Due to the established beliefs that people have about climate change and due to the nature of the threat that climate change poses, it is important to examine the effects of self-affirmation under conditions in which no explicit information is presented and where people have to access their prior beliefs about, and attitudes towards, environmental threats. In the present study, I examined whether existing ecological worldviews (in a nonpersuasive context) might moderate self-affirmation effects on the following indicators of people's pro-environmental motives: perceptions of pro-environmental behaviour as a personal moral principle, perceptions of the effort required to reduce one's carbon footprint, perceived self-efficacy with regard to pro-environmental behaviour, and intentions to carry out pro-environmental actions.

I propose that self-affirmation may polarise orientations towards environment-related actions. Self-affirmation has been shown to enhance self-confidence in the validity of one's opinions (Briñol et al., 2007). When people hold previously formed opinions on an issue and these opinions are not subjected to a persuasive message, self-affirmation might potentially serve to encourage people to trust their initial position; that is, to affirm their current worldviews. Thus, I hypothesized that self-affirmation can accentuate previously-held ecological worldviews. This would produce more pro-environmental responses among people with positive ecological worldviews, who are concerned about the environment and who believe that the natural environment is

highly susceptible to human interference (Dunlap, Van Liere, Mertig, & Jones, 2000). In contrast, I expected that self-affirmation would lead to less environmental responses among people who are less concerned about the environment and who are sceptical, for example, about the role of human intervention in climate change processes (i.e., among people with negative ecological worldviews).

## Method

### Participants

Ninety (76 female, 14 male) non-psychology students at a UK university participated in this study. Their ages ranged from 18 years to 48 years ( $M = 22.32$ ,  $SD = 5.81$ ). Participants who completed the study were automatically included in a prize draw in which they had a chance of winning £100.

### Design and Procedure

Participants were invited by email to participate in an online study that consisted of two questionnaires. The email message included the link to the first questionnaire, which directed participants to a short pretest. In this pretest, ecological worldviews were assessed with the revised New Ecological Paradigm scale (NEP; Dunlap et al., 2000), which consisted of 15 items (e.g. “Humans are severely abusing the environment”, 1 = *strongly disagree*, 7 = *strongly agree*),  $\alpha = .75$ .

To reduce possible effects of ecological worldview salience, a link to the second questionnaire of the study was sent to the participants one week after completion of the pretest. Participants were sequentially assigned to the affirmation or to the control condition.

**Self-affirmation manipulation.** A list containing nine values (e.g. *honesty*, *kindness*, *loyalty*) was presented to the participants in the affirmation condition ( $n = 43$ ), which was adapted from Sherman et al. (2000, Study 2). Participants were asked to

select the value that was most important to them, to write a short statement about why it was important to them and how they used the selected value in their everyday life. Participants in the control condition ( $n = 47$ ) completed a task similar to that used by Cohen, Aronson and Steele (2000, Study 1), in which participants were asked to list everything that they had eaten or drunk in the previous 48 hours.

After the self-affirmation manipulation, participants completed the dependent measures. All responses were provided on Likert-type scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*); measures were constructed from the means of the constitutive items.

**Moral judgment.** Moral judgment about pro-environmental behaviour was measured with two items: “It seems ethical to me to adjust one’s lifestyle in order to protect the earth” and “Trying to reduce your carbon footprint is the right thing to do”,  $r(88) = .73, p < .001$ .

**Perceived effort required to reduce carbon footprint.** Five items were developed to assess the perceived effort it would require to reduce one’s own carbon footprint (e.g. “It would take much effort to reduce my carbon footprint”),  $\alpha = .88$ .

**Self-efficacy.** Five items (adapted from Van Zomeren, Spears & Leach, 2010) assessed self-efficacy with regard to pro-environmental behaviour (e.g. “There are simple things I can do that contribute to preventing the negative consequences of climate change”),  $\alpha = .90$ .

**Pro-environmental intentions.** Six items were used to measure intentions to increase pro-environmental behaviour (e.g. “I intend to reduce my carbon footprint from now on”),  $\alpha = .98$ .

## Results

Two-step hierarchical regression analyses were performed to examine the effects of self-affirmation (1 = *affirmation* vs. 0 = *control*), ecological worldviews (as a mean-centred continuous variable), and the two-way interaction on each outcome measure. The moderating effects of ecological worldviews were probed further by conducting separate regression analyses for the affirmation and the control conditions, and by comparing the effects of self-affirmation separately for positive ecological worldview participants and negative ecological worldview participants (assessed at 1 *SD* above and below the mean, as recommended by Aiken and West, 1991).

**Moral judgment.** The analysis of moral judgment yielded a significant interaction between self-affirmation and ecological worldviews,  $\beta = .32$ ,  $t = 2.65$ ,  $p = .01$ , semipartial  $R^2 = .07$ . (see Figure 1). Ecological worldviews were a significant predictor of moral judgment in the affirmation condition,  $\beta = .55$ ,  $t = 4.21$ ,  $p < .001$ ,  $R^2 = .30$ . There was no significant effect of ecological worldviews in the control condition,  $\beta = .18$ ,  $t = 1.20$ ,  $p = .24$ ,  $R^2 = .03$ . As predicted, negative ecological worldview participants reported less pro-environmental moral judgments about lifestyle change in the affirmation condition than in the control condition,  $\beta = -.31$ ,  $t = -2.22$ ,  $p = .03$ . The effect of self-affirmation on moral judgments for positive ecological worldview participants did not reach statistical significance,  $\beta = .23$ ,  $t = 1.61$ ,  $p = .11$ ; however, participants with very positive ecological worldviews (1.5 *SD* above the mean) reported significantly more pro-environmental moral judgments in the affirmation condition than in the control condition,  $\beta = .36$ ,  $t = 1.99$ ,  $p = .05$ .

**Perceived effort required to reduce carbon footprint.** A significant interaction effect between self-affirmation and ecological worldviews was found on perceived effort required to reduce carbon footprint,  $\beta = -.49$ ,  $t = -3.90$ ,  $p < .001$ ,

semipartial  $R^2 = .15$  (see Figure 2). Ecological worldviews were a stronger predictor of perceived effort required to reduce carbon footprint in the affirmation condition,  $\beta = -.42$ ,  $t = -2.99$ ,  $p = .005$ ,  $R^2 = .18$ , than in the control condition,  $\beta = .33$ ,  $t = 2.32$ ,  $p = .03$ ,  $R^2 = .11$ . As predicted, negative ecological worldview participants reported more perceived effort in the affirmation condition than in the control condition,  $\beta = .37$ ,  $t = 2.57$ ,  $p = .01$ . By contrast, positive ecological worldview participants reported less perceived effort in the affirmation condition than in the control condition,  $\beta = -.44$ ,  $t = -3.07$ ,  $p = .003$ .

**Self-efficacy.** The analysis of self-efficacy yielded a marginally significant interaction between self-affirmation and ecological worldviews,  $\beta = .23$ ,  $t = 1.87$ ,  $p = .07$ , semipartial  $R^2 = .04$  (see Figure 3). Ecological worldviews were a significant predictor of self-efficacy in the affirmation condition,  $\beta = .47$ ,  $t = 3.45$ ,  $p = .001$ ,  $R^2 = .23$ . There was no significant effect of ecological worldviews in the control condition,  $\beta = .22$ ,  $t = 1.50$ ,  $p = .14$ ,  $R^2 = .05$ . As predicted, negative ecological worldview participants reported lower levels of self-efficacy regarding pro-environmental behaviour in the affirmation condition than in the control condition,  $\beta = -.28$ ,  $t = -1.99$ ,  $p = .05$ . There was no effect of self-affirmation on self-efficacy for positive ecological worldview participants,  $\beta = .10$ ,  $t = .72$ ,  $p = .47$ .

**Pro-environmental intentions.** There was a main effect of self-affirmation on pro-environmental intentions,  $\beta = .24$ ,  $t = 2.35$ ,  $p = .02$ , semipartial  $R^2 = .06$ : Participants in the affirmation condition reported greater intentions to reduce their carbon footprint ( $M = 5.09$ ,  $SD = 1.06$ ) than did their counterparts in the control condition ( $M = 4.55$ ,  $SD = 1.17$ ). There was no significant interaction between self-affirmation and ecological worldviews,  $\beta = .15$ ,  $t = 1.15$ ,  $p = .25$ , semipartial  $R^2 = .01$ . It is noteworthy, however, that the planned contrasts revealed that positive ecological

worldview participants reported stronger pro-environmental intentions in the affirmation condition than in the control condition,  $\beta = .37$ ,  $t = 2.46$ ,  $p = .02$ , whereas negative ecological worldview participants did not,  $\beta = .12$ ,  $t = .81$ ,  $p = .42$  (see Figure 4).

### Discussion

Previous research has shown that self-affirmation can reduce defensive responses to messages that focus on individual threats. However, little is known about the effects of self-affirmation in a nonpersuasive context on existing cognitions about a familiar collective threat that is largely beyond an individual's control, such as climate change. In this research, I proposed that self-affirmation can bolster orientations towards environment-related actions when people only have recourse to their existing beliefs. Whereas self-affirmation manipulations that include a persuasive threatening message have been shown to promote more openness to threats to the self (e.g., Sherman & Cohen, 2006), my results are compatible with the suggestion that self-affirmation without such a message can promote a validation of previously-held beliefs towards potentially threatening issues. More specifically, my findings showed that ecological worldview effects were accentuated through self-affirmation in the absence of a threatening persuasive message. Self-affirmation led to more pro-environmental responses to climate change among participants with positive ecological worldviews and to less pro-environmental responses to climate change among participants with negative ecological worldviews.

I found that self-affirmation resulted in more pro-environmental responses only among those participants who are likely to be amenable to the idea of adapting one's environment-related behaviour. Individuals with (very) positive ecological worldviews reported more pro-environmental moral judgments, less perceived effort involved in

reducing their carbon footprint, and more positive pro-environmental intentions in the self-affirmation condition compared to the control condition. It should be noted that self-affirmation did not increase self-efficacy with regard to pro-environmental behaviour for positive ecological worldview participants. This could potentially be due to ceiling effects, as participants with positive ecological worldviews reported high levels of self-efficacy in the control condition. By contrast, self-affirmation resulted in less pro-environmental responses among participants who might be expected to be more resistant to adapting their environment-related behaviours. Thus, self-affirmed participants with negative ecological worldviews reported less pro-environmental moral judgments, more perceived effort involved in reducing their carbon footprint, and marginally lower levels of self-efficacy regarding the performance of pro-environmental behaviours compared to their counterparts in the control condition. Interestingly, self-affirmation did not appear to influence the pro-environmental intentions of negative ecological worldview participants. Further research is required to explore more fully the boundary conditions of self-affirmation manipulation effects on intentions and other pro-environmental responses.

In previous research, self-affirmation has been shown to increase self-confidence in the validity of one's own thoughts regarding a nonthreatening persuasive message (Briñol et al., 2007). The current study extends this finding by showing that the effects of self-affirmation are not limited to a validation of cognitive responses to nonthreatening messages, but it can also lead to a polarization of environmental orientations in a nonpersuasive context. Although I did not explore the underlying processes that accompany these validations of ecological worldviews, I suspect that self-affirmation may enhance self-confidence in established beliefs about a familiar topic when no persuasive message is presented. In the absence of a threatening

persuasive message, self-affirmation may induce a greater reliance on prior knowledge and opinions due to an increase in self-confidence (Briñol et al., 2007). An alternative explanation for the polarization of established beliefs about environmental threats through self-affirmation is that by writing about personally important values, the self-concept tends to become clearer and more coherent (Wakslak & Trope, 2009), which may in turn result in stronger beliefs. These two explanations are clearly not mutually exclusive and subsequent studies might usefully explore the potentially differential pathways through which self-affirmation can validate personal convictions.

Previous self-affirmation research has indicated that people tend to be more defensive about beliefs that are important to their self-concept. Self-affirmation manipulations have consequently been shown to be most effective in individuals for whom a threat is of high perceived personal relevance (Correll, Spencer, & Zanna, 2004; Reed & Aspinwall, 1998). However, the role of the perceived personal relevance or importance of climate change issues in self-affirmation effects is likely to be more complex, since climate change can be construed as a global threat that is potentially relevant to everyone. Whereas it is relatively commonplace to categorize people in terms of the personal relevance of behaviour-specific individual threats, I suggest that the perceived importance of reducing carbon footprints to mitigate climate change effects might be approached as a continuum on which more polarized views reflect greater personal issue involvement. The current findings are consistent with this suggestion in that self-affirmation primarily influenced people with more polarized environmental orientations.

In conclusion, my results showed that self-affirmation can accentuate previously-held environmental orientations when no information is introduced to challenge those beliefs. These issues clearly need to be explored in more detail.



However, I feel that this study provides an important initial step in our understanding of the contextual and personal conditions under which self-affirmation may motivate people to tread more carefully with their own carbon footprints.

## Figures

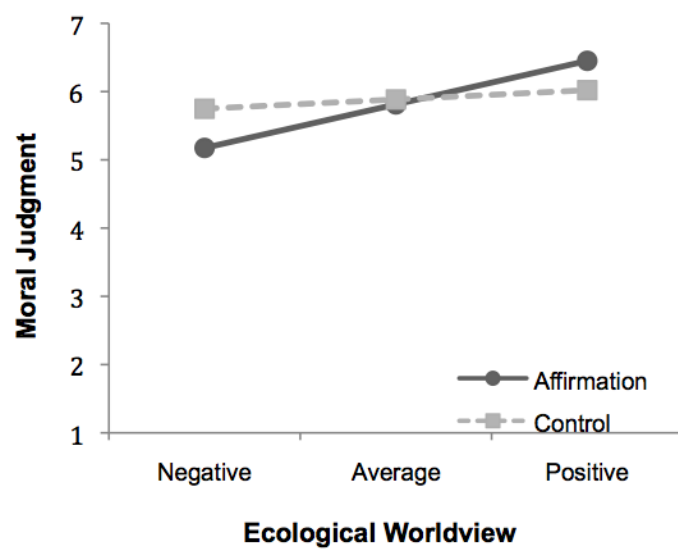
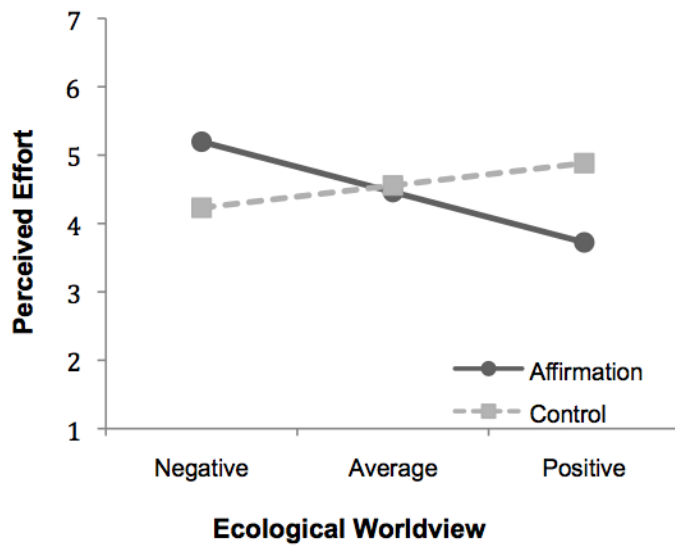
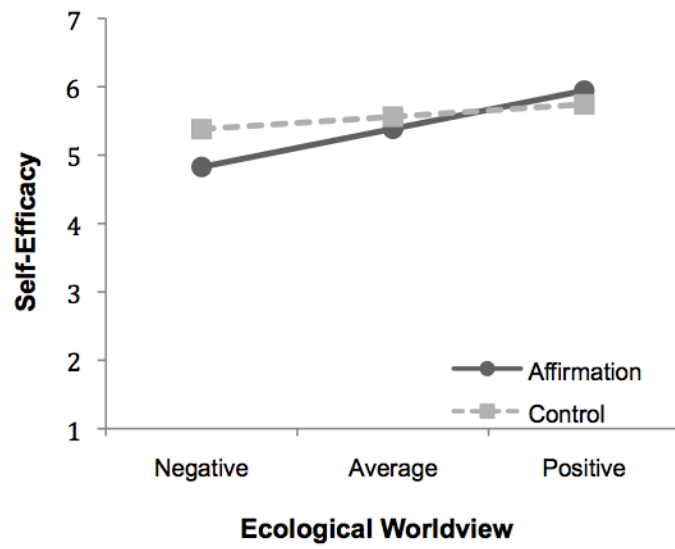


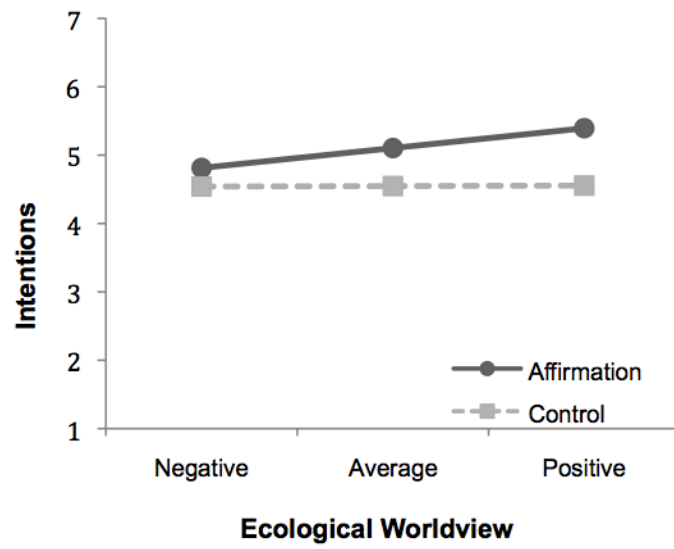
Figure 1. Moral judgment regressed onto ecological worldview, by self-affirmation.



*Figure 2.* Perceived effort to reduce carbon footprint regressed onto ecological worldview, by self-affirmation.



*Figure 3.* Self-efficacy regressed onto ecological worldview, by self-affirmation.



*Figure 4.* Pro-environmental intentions regressed onto ecological worldview, by self-affirmation.

## CHAPTER 4

### Perceptions of Climate Change Consequences

This chapter was adapted from Van Prooijen and Sparks (submitted). The first author was the principal investigator for the current research. The second author provided suggestions regarding the design of the experiment and commented on the manuscript.

Despite the urgency of climate change and the scientific consensus about the role of human impact on this process (Oreskes, 2004), persuading people of the reality of climate change consequences remains a scientific and social challenge. Perceptions of the dangers of climate change are often underestimated (Leiserowitz, 2005) and information describing severe climate change consequences is often rejected by the public (Langford, 2002), which in turn can negatively affect the willingness to address these problems (O'Connor, Bord, & Fisher, 1999). The current research aims to determine if the acceptance of climate change consequences is increased through self-affirmation. I suggest that affirming one's self-image by reflecting on personally important values can promote more acceptance of climate change information and stronger perceived control over a collective threat that is climate change.

### **Defensiveness and self-affirmation**

Several environmental campaigns have been designed to inform people about climate change and to increase the perceptions of the dangers attached to it. However, an obstacle that can undermine persuasion in this process is that people may have a tendency to resist that climate change poses a serious threat (Langford, 2002), thereby affecting the way in which information is processed. For instance, people have been shown to be motivated to judge information with a self-serving bias in order to confirm their original beliefs and to maintain an unrealistic sense of optimism about the probability that undesirable outcomes will not affect them personally (Ditto & Lopez, 1992; Kunda, 1987; Liberman & Chaiken, 1992; Lord, Ross, & Lepper, 1979). Furthermore, climate change can induce a level of fear due to the association with uncertainty and mortality issues, which in turn facilitates a defensive avoidance of threatening information about environmental risks (Loewenstein, Weber, Hsee, & Welch, 2001; Pyszczynski, Greenberg, & Solomon, 1999). Through these defensive

mechanisms, the learning and persuasion outcomes about climate change dangers that could potentially result from an open and unbiased approach to information processing may be hampered, reducing the likelihood that people will adjust their views and subsequent actions.

Self-affirmation theory suggests that people are strongly motivated to maintain a positive self-image, and defensive mechanisms can originate in situations where this positive self-image is threatened (Steele, 1988). When people are confronted with information that harms their positive self-image, they may seek to defend this image by denying the information. A more constructive strategy to maintain a positive self-image is by affirming a value that is important to the self-concept. By reflecting on important aspects of their self-image, people are reminded that the threat does not have to lead to a reduction in self-worth. The affirmation of their self-image can provide a buffer against the threatening information, allowing people to adopt a more open and adaptive information-processing strategy. The notion that self-affirmation reduces defensiveness has been supported in a range of studies. For instance, self-affirmation has been shown to increase objectivity in the evaluation of counterattitudinal information (Cohen, Aronson, & Steele, 2000; Correll, Spencer, & Zanna, 2004), promote beneficial health-related intentions and behaviours (Jessop, Simmonds & Sparks, 2009; Sherman, Nelson, & Steele, 2000; Van Koningsbruggen, Das, & Roskos-Ewoldsen, 2009), and lead to less defensiveness and more message acceptance when people are confronted with threatening health-related information (Harris & Napper, 2005; Sherman et al., 2000).

### **The present research**

While self-affirmation has shown to lead to a greater acknowledgement of potential risks, these findings have mainly been tested using health-related risk messages (Harris & Napper, 2005; Sherman et al., 2000). In the present study I



examined whether self-affirmation can also promote greater message acceptance in conditions where the threat is not focused on specific personal threats, but is instead focused on a global collective threat to humanity. Climate change involves a variety of threats, such as loss of habitat and biodiversity, reduced economic growth, and increased intergroup conflicts about scarce resources, as well as threats to personal physical health (IPCC, 2007b; Stern, 2006). Simultaneously, however, climate change brings a high level of uncertainty in terms of personal risk; climate change is often seen as a relatively abstract threat that is highly unlikely to directly affect the individual (Weber, 2006). In contrast, people are likely to be more aware of the risk of developing a disease due to the impact of health risk-increasing factors such as genetics and specific health-behaviours (e.g. smoking, excessive alcohol consumption; Croyle & Lerman, 1999; Steptoe & Wardle, 2001). It is therefore important to extend self-affirmation research by establishing if affirming personal self-worth can also increase the acceptance of collective, global risks. Additionally, the current study examined whether self-affirmation can promote the generalization of global climate change consequences targeted by the message to perceptions of (more proximal) national effects of climate change that are not explicitly addressed in the message. A generalization to national consequences of climate change would suggest that the belief that climate change will not pose a serious risk to one's own society can be reduced as a result of affirming one's self-image.

Self-affirmation has been shown to lead to higher perceived efficacy of lowering the chances of developing health problems (Epton & Harris, 2008; Harris, Mayle, Mabbott, & Napper, 2007) and to lower minimization of self-involvement in climate change problems (Sparks, Jessop, Chapman, & Holmes, 2010), but it is unknown if self-affirmation can empower people to believe that their actions can have a positive effect

on the mitigation of a global threat such as climate change. A barrier to motivate people to address climate change is the belief that individual efforts to reduce carbon emissions will have little to no impact (Lorenzoni, Nicholson-Cole, & Whitmarsh, 2007; O'Connor, Bord, & Fisher, 1998). I included measures of self-efficacy about reducing the consequences of climate change and pessimism induced by climate change information in order to examine whether self-affirmation can promote perceived individual control over climate change mitigation. Correspondingly, pro-environmental intentions were also assessed to see if self-affirmation increases the acceptance of the personal implications of climate change with regard to reducing carbon emissions.

Furthermore, in the current study I tested whether initial beliefs about the impact of human interference on ecological stability would moderate the effects of self-affirmation on the acceptance of climate change information. I expected that information illustrating climate change dangers should evoke high defensiveness among people who are sceptical about the idea that human actions can alter ecological stability, since the information represents a counterattitudinal view for them. I therefore predicted that self-affirmation would promote greater message acceptance in this specific group. In contrast, it is likely that people who are less sceptical about the human impact on ecological stability will have higher initial perceptions of climate change consequences. Defensive responses towards climate change information should therefore be lower, which should minimize the impact of self-affirmation in this group.

## **Method**

### **Participants**

Eighty-eight non-psychology students at a UK university (70 females, 18 males) participated in this study. The age of the participants ranged from 18 years to 42 years

( $M = 21.70$ ,  $SD = 4.07$ ). Participants were automatically included in a prize draw in which they had a chance to win £100.

### **Design and procedure.**

Participants were approached via email and invited to participate in an online study that consisted of two questionnaires. The first questionnaire contained the measure of initial beliefs about the human impact on ecological stability. A link to the second questionnaire was sent to the participants one week after completion of the first questionnaire. Participants were sequentially assigned to the affirmation or the control condition. Following the self-affirmation manipulation, participants were asked to read the climate change information. Finally, the outcome measures were administered.

### **Materials**

**Initial beliefs.** Initial beliefs about the human impact on ecological stability were measured with the “fragility of nature’s balance” subscale of the New Ecological Paradigm (NEP; Dunlap, Van Liere, Mertig, & Jones, 2000), which consisted of three items (e.g. “The balance of nature is strong enough to cope with the impacts of modern industrial nations”). The items were presented on a Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), with lower scores reflecting higher levels of scepticism about the impact of human actions on ecological stability ( $\alpha = .65$ ).<sup>1</sup>

**Self-affirmation manipulation.** Participants in the affirmation condition ( $n = 41$ ) were given a list of nine values (e.g. *altruism, fairness, forgiveness*; adapted from Sherman et al., 2000, Study 2). Participants selected the value that was most important to them, and wrote a short statement about why it was important to them and how they used the selected value in their everyday life. Participants in the control condition ( $n = 47$ ) listed everything that they had eaten or drunk in the past 48 hours (adapted from Cohen et al., 2000, Study 1).

**Climate change information.** Participants read a text from the United Nations (n.d.) about the impact of human activity on climate change, the increase in greenhouse gas emissions in comparison to pre-industrial values, how the impacts of climate change can become more manageable through global mitigation action, and what the possible scenarios for vulnerable populations are if no effort is taken to reduce the global emission of greenhouse gasses.

**Outcome measures.** All outcome measures were assessed on Likert-type scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A definition of a carbon footprint was provided before the items were presented.

**Perceptions of global consequences.** Perceptions of negative global climate change consequences were assessed with three items (adapted from Leiserowitz, 2005; e.g. “I think that it is likely that there will be an increase in rates of disease worldwide due to climate change in the next 50 years if carbon emissions are not significantly reduced”,  $\alpha = .85$ ).

**Perceptions of national consequences.** The same three items that were used to measure perceptions of negative global climate change consequences were modified to assess perceptions of the impact of climate change on the UK (e.g. “I think that it is likely that there will be a decrease in standards of living in the UK due to climate change in the next 50 years if carbon emissions are not significantly reduced”,  $\alpha = .90$ ).

**Self-efficacy.** Four items (adapted from Van Zomeren, Spears, & Leach, 2010) assessed self-efficacy with regard to reducing the consequences of climate change (e.g. “There are simple things I can do that contribute to preventing the negative consequences of climate change”,  $\alpha = .90$ ).

**Pessimism.** Pessimism induced by climate change information was measured with four items (“When I read the information about climate change that was presented

earlier, I felt..." [hopeless, a general feeling of pessimism, a sense of futility, helpless],  $\alpha = .79$ ).

***Pro-environmental intentions.*** Six items were used to measure pro-environmental intentions (e.g. "I intend to reduce my carbon footprint from now on",  $\alpha = .98$ ).

## Results

A hierarchical regression analysis was conducted for each outcome measure to examine (a) the main effects of self-affirmation and initial beliefs, and (b) if the effects of self-affirmation were moderated by initial beliefs. The dummy-coded self-affirmation condition (1 = *affirmation* vs. 0 = *control*) and initial beliefs (as a mean-centred continuous variable) were entered as main effects in the first step of the analysis. The interaction between self-affirmation and initial beliefs was added at step 2. A significant interaction was examined by calculating simple slopes for less sceptical versus more sceptical participants (i.e. 1 *SD* above and below the mean initial beliefs scores, as recommended by Aiken and West, 1991). Bivariate correlations between the outcome measures are displayed in Table 4.

**Perceptions of global consequences.** Initial beliefs emerged as a significant predictor of perceptions of global consequences: Stronger belief in the human impact on ecological stability was associated with higher perceived negative global consequences of climate change,  $\beta = .42$ ,  $t = 4.30$ ,  $p < .001$ , semipartial  $R^2 = .18$ . Furthermore, the analysis revealed a significant interaction effect,  $\beta = -.25$ ,  $t = -2.04$ ,  $p = .05$ , semipartial  $R^2 = .04$  (see Figure 5). A marginally significant effect of self-affirmation was found among more sceptical participants, who reported higher perceptions of negative global climate change consequences in the affirmation condition than in the control condition,

$\beta = .26$ ,  $t = 1.81$ ,  $p = .07$ . No significant difference between conditions was found among less sceptical participants,  $\beta = -.15$ ,  $t = -1.10$ ,  $p = .27$ .

**Perceptions of national consequences.** The analysis revealed a significant main effect of initial beliefs: Stronger belief in the human impact on ecological stability was associated with higher perceived negative national consequences of climate change,  $\beta = .37$ ,  $t = 3.64$ ,  $p < .001$ , semipartial  $R^2 = .13$ . Furthermore, a significant interaction effect was found,  $\beta = -.32$ ,  $t = -2.59$ ,  $p = .01$ , semipartial  $R^2 = .06$  (see Figure 6). In line with my hypothesis, more sceptical participants reported higher perceptions of negative national climate change consequences in the affirmation condition than in the control condition,  $\beta = .33$ ,  $t = 2.33$ ,  $p = .02$ . There was no effect of self-affirmation on perceptions of national climate change risk for less sceptical participants,  $\beta = -.19$ ,  $t = -1.37$ ,  $p = .18$ .

**Self-efficacy.** A marginally significant main effect of self-affirmation on self-efficacy was found,  $\beta = .17$ ,  $t = 1.73$ ,  $p = .09$ , semipartial  $R^2 = .03$ . Participants in the affirmation condition reported greater self-efficacy ( $M = 5.48$ ,  $SD = 1.11$ ) than participants in the control condition ( $M = 4.87$ ,  $SD = 1.56$ ). Furthermore, a significant main effect of initial beliefs emerged: Stronger belief in the human impact on ecological stability was associated with greater self-efficacy with regard to reducing the consequences of climate change,  $\beta = .36$ ,  $t = 3.61$ ,  $p = .001$ , semipartial  $R^2 = .13$ . These main effects were qualified by a significant interaction effect,  $\beta = -.34$ ,  $t = -2.78$ ,  $p = .007$ , semipartial  $R^2 = .07$  (see Figure 7). As predicted, more sceptical participants reported greater self-efficacy in the affirmation condition than in the control condition,  $\beta = .46$ ,  $t = 3.25$ ,  $p = .002$ . In contrast, there was no significant difference between conditions among less sceptical participants,  $\beta = -.09$ ,  $t = -.68$ ,  $p = .50$ .

**Pessimism.** The analysis showed that initial beliefs were a significant predictor of pessimism: Stronger belief in the human impact on ecological stability evoked greater pessimism about the climate change information,  $\beta = .36$ ,  $t = 3.56$ ,  $p = .001$ , semipartial  $R^2 = .13$ . Furthermore, a significant interaction effect was found,  $\beta = -.32$ ,  $t = -2.52$ ,  $p = .01$ , semipartial  $R^2 = .06$  (see Figure 8). The effect of self-affirmation on pessimism did not reach significance among more sceptical participants,  $\beta = .23$ ,  $t = 1.59$ ,  $p = .12$ . However, less sceptical participants reported lower levels of pessimism about the climate change information in the affirmation condition than in the control condition,  $\beta = -.28$ ,  $t = -2.03$ ,  $p = .05$ .

**Pro-environmental intentions.** Initial beliefs emerged as a significant predictor of pro-environmental intentions: Stronger belief in the human impact on ecological stability was associated with more pro-environmental intentions,  $\beta = .25$ ,  $t = 2.36$ ,  $p = .02$ , semipartial  $R^2 = .06$ . However, no significant main effect of self-affirmation,  $\beta = .06$ ,  $t = 0.56$ ,  $p = .58$ , semipartial  $R^2 = .004$ , nor interaction effect between initial beliefs and self-affirmation were found,  $\beta = -.20$ ,  $t = -1.51$ ,  $p = .14$ , semipartial  $R^2 = .02$ .

## Discussion

Whereas previous research has mainly focused on the effects of self-affirmation on the acceptance of health-risk information, the present study is the first that has examined self-affirmation effects on perceptions of the dangers of - and perceived control over - an ongoing global threat that is climate change. As hypothesized, my findings showed that self-affirmation increased perceptions of both negative global and national climate change consequences among participants with initially sceptical beliefs, which suggests that self-affirmation effects are not solely limited to the acceptance of a distant threat that was targeted by the provided information, but instead can also promote a generalization to more proximal risks of climate change to one's own country

that are not explicitly mentioned in the information. Furthermore, I found that self-affirmation led to more self-efficacy with regard to reducing the consequences of climate change. This finding is important as it suggests that the belief that individual behaviour cannot effectively lead to a mitigation of a global problem such as climate change (Lorenzoni et al., 2007; O'Connor et al., 1998) can be attenuated through self-affirmation, which in turn may facilitate a more positive and open approach to individual actions aimed at reducing carbon emissions.

This research also highlighted the moderating role of initial beliefs about the human impact on ecological stability on self-affirmation effects. I anticipated that self-affirmation effects on the acceptance of climate change risk information would only be apparent among people who were sceptical about the impact of human interference on ecological stability, since this group is likely to have lower perceptions of anthropogenic climate change effects. In support of this prediction, my findings revealed that self-affirmation only led to higher perceptions of climate change consequences and to greater self-efficacy among participants with initially sceptical beliefs about the idea that human actions can alter ecological stability. An exception was found in the decrease in pessimism that was evoked by the climate change information among affirmed less sceptical participants who acknowledged the impact of humans on ecological stability, whereas information-induced pessimism was not influenced by self-affirmation among initially more sceptical participants. However, research has shown that thinking about climate change tends to be associated with feelings of pessimism and helplessness among people who are concerned about the environment (Norgaard, 2006). In line with these findings, my results demonstrated that less sceptical participants reported higher levels of information-induced pessimism about climate change in the control condition than did more sceptical participants,



which makes the potential ability of self-affirmation to reduce pessimism more apparent in this group.

Despite these positive effects of self-affirmation on perceptions of climate change consequences and perceived individual control over climate change outcomes, I found no evidence of self-affirmation promoting an increase in pro-environmental intentions. However, the effects of self-affirmation on intentions to adapt behaviour have been shown to differ from the effects on other outcome measures (Reed & Aspinwall, 1998; Van Prooijen, Sparks, & Jessop, in press). I suspect that committing to an actual change in behaviour through the expression of intentions is a complex step that is dependent on various factors (Ajzen, 1991), and may therefore not be a suitable indicator of the acceptance of risk information. Furthermore, it is important to note that the measurement of perceptions of national climate change consequences was focused on potential climate change effects for the UK within the next 50 years. The finding that self-affirmation promotes higher perceptions of negative national consequences may suggest that initially sceptical people are more likely to accept the potential risk of being personally affected by climate change when they are self-affirmed. However, it is necessary for future research to assess whether the belief that climate change problems will not have personal consequences is attenuated through self-affirmation by assessing personal risk perceptions of climate change within a more proximal time frame.

## **Conclusion**

The present study has extended previous research by showing that reflecting on important personal values can enhance the acceptance of risk information that is focused on a global threat to humanity among people who are initially resistant to this information. Self-affirmation does not only increase the acceptance of global climate change consequences, but it also promotes a generalization to accept the more proximal

risks of climate change and it empowers people to believe in their own efficacy to reduce climate change outcomes. Thus, affirming one's self-image can promote greater risk acceptance of and more perceived individual control over a collective, multifaceted threat that is climate change among people who are initially sceptical about the impact of human interference on ecological stability.

## Footnote

<sup>1</sup> The reliability of the “fragility of nature’s balance” subscale of the NEP increased when the item “When humans interfere with nature it often produces disastrous consequences” was removed from the subscale ( $\alpha = .73$ ). However, excluding this item from the subscale did not significantly influence the results. It was therefore decided to use the complete “fragility of nature’s balance” NEP subscale.

Table 4

*Bivariate correlations between outcome measures (N = 88)*

Outcome measures	1	2	3	4	5
1. Perceptions of global consequences	-	-	-	-	-
2. Perceptions of national consequences	.63***	-	-	-	-
3. Self-efficacy	.42***	.42***	-	-	-
4. Pro-environmental intentions	.53***	.57***	.48***	-	-
5. Pessimism	.31**	.18	.18	.005	-

\*\*  $p < .01$ , \*\*\*  $p < .001$

## Figures

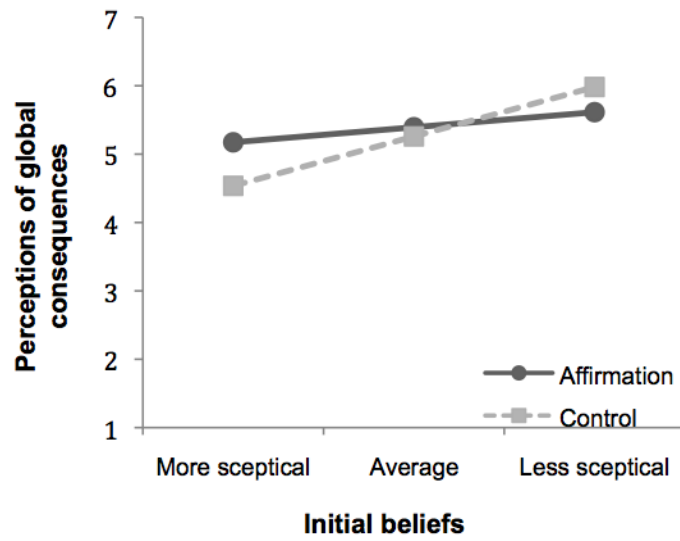
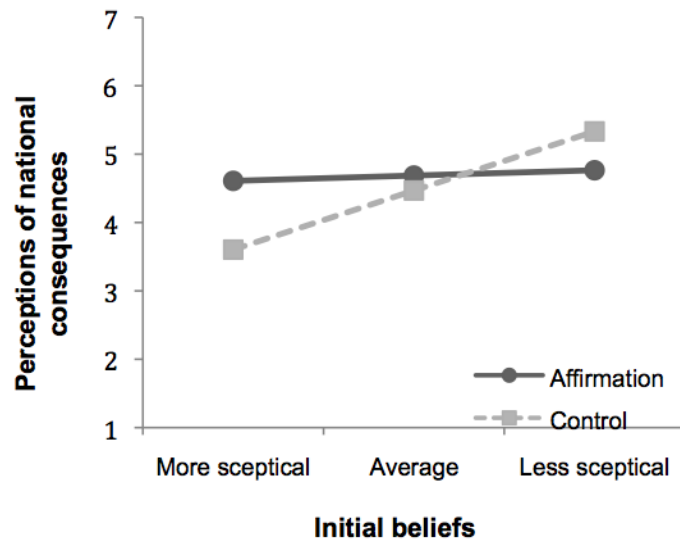
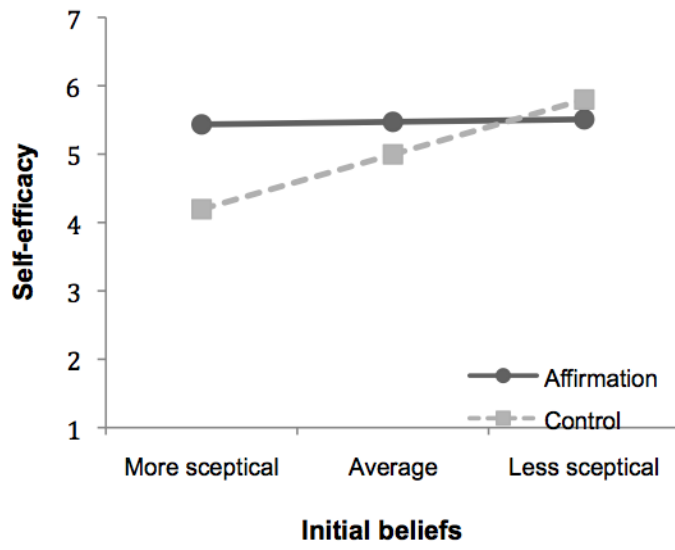


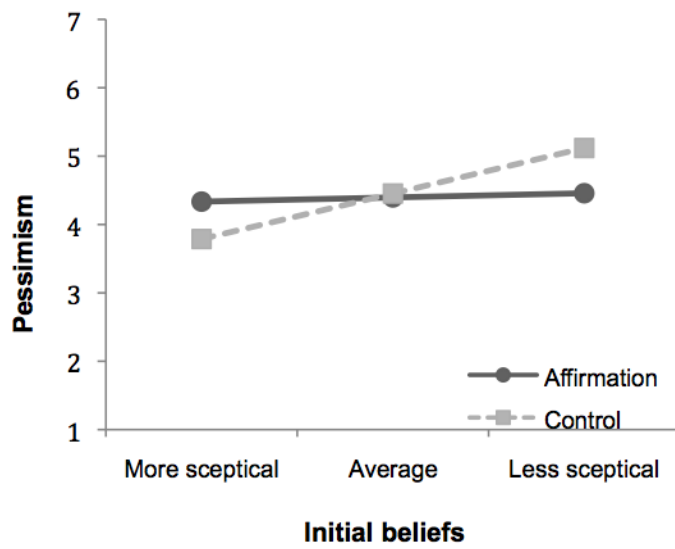
Figure 5. Perceptions of global climate change consequences regressed onto initial beliefs scores, by self-affirmation.



*Figure 6.* Perceptions of national climate change consequences regressed onto initial beliefs scores, by self-affirmation.



*Figure 7.* Self-efficacy with regard to reducing the consequences of climate change regressed onto initial beliefs scores, by self-affirmation.



*Figure 8.* Pessimism about climate change regressed onto initial beliefs scores, by self-affirmation.



## CHAPTER 5

### Group-Affirmation Versus Self-Affirmation

In contexts where multiple groups are negatively contributing to a problem of common resources and where collective action is deemed appropriate but is not properly implemented, group members are likely to justify the impact of their group to the problem as the responsibility of each individual group is diffused (Gifford, 2008; Kerr, 1983; Komorita & Lapworth, 1982). One such context is climate change, which presents a global problem for which many nations share a responsibility due to their high levels of greenhouse gas emissions and unsustainable consumption of resources (IPCC, 2007a; Stern, 2006). Yet, there is a tendency among citizens to minimize the impact of one's nation on climate change by asserting that their contribution is insignificant compared to other nations, and that their nation is relatively powerless to mitigate climate change consequences (Norgaard, 2006; Opatow & Weiss, 2000).

Being confronted with harmful actions conducted by a group or nation to which we belong can provoke a strong desire to justify these actions in order to protect our social identity (Tajfel & Turner, 1979). The motivation to maintain a favourable perception of an important ingroup can increase defensive biases that are manifested by, for example, attributing blame to an outgroup (Lickel, Miller, Stenstrom, Denson, & Schmader, 2006). In this study I contrasted the effects of affirmations of the individual self (self-affirmation) to affirmations of the collective self (group-affirmation) on the need to justify the actions of one's nation in a climate change context. Whereas both affirmation strategies have been shown to be effective in coping with collective threats to identity (Gunn & Wilson, 2011; Sherman & Cohen, 2006; Sherman, Kinias, Major, Kim, & Prenovost, 2007), I aim to determine whether group-affirmation, in comparison to self-affirmation, can increase resistance towards the acceptance of the contribution of one's nation to climate change, and whether national identification and ecological worldviews may moderate these effects.

### **Self-affirmation and the collective identity**

According to self-affirmation theory (Steele, 1988), people can respond defensively to information that threatens an important aspect of their self-concept. These defensive responses can be attenuated if people engage in the affirmation of alternative sources of self-worth. The bolstering of general self-integrity allows people to maintain a positive self-image and reduces the need to distort the threat. Several studies have demonstrated that self-affirmation promotes a more open and less biased approach to information that threatens the individual self-identity (Cohen, Aronson, & Steele, 2000; Harris & Napper, 2005; Sherman, Nelson, & Steele, 2000). However, self-affirmation can also be an effective strategy to cope with threats to the collective self-identity (Sherman & Cohen, 2006); people derive self-worth from their group membership and the concepts of collective identity and individual identity are fundamentally entwined (Cohen & Garcia, 2005; Ellemers, Spears, & Doosje, 2002).

As group membership can be an important part of self-definition, people are motivated to defend the positive image of both their individual self and their collective self. The affirmation of an aspect of the individual self-identity that is unrelated to the collective threat can help to restore or boost the perception of general self-worth. For example, performance on ability-diagnostic tasks is undermined in situations where people experience stereotype threat, which presents a threat to the collective self as people are concerned about confirming a negative stereotype about their group (Steele & Aronson, 1995). However, studies have demonstrated that stereotype threat was reduced by affirming a valued aspect of the self-concept, which in turn increased task performance (Martens, Johns, Greenberg, & Schimel, 2006; Schimel, Arndt, Banko, & Cook, 2004). Additionally, self-affirmation has been shown to reduce the denial of racism against stigmatized groups (Adams, Tormala, & O'Brien, 2006), to decrease

prejudiced evaluations (Fein & Spencer, 1997), and to increase support for Black programs among White individuals (Harvey & Oswald, 2000). These results provide support for the notion that affirming a valued aspect of the individual's self-image can make a threat to collective identity more enduring, as the collective identity is a part of the self-definition (Sherman & Cohen, 2006).

### **The gain of group-affirmation**

Recently, research has started to examine the effects of group-affirmation on responses to threats to the collective self. Group-affirmation can enhance the social identity by boosting the positive distinctiveness of the group, and has been shown to reduce defensiveness that stems from collective threats (Derks, Scheepers, Van Laar, & Ellemers, 2011; Derks, Van Laar, & Ellemers, 2009; Gunn & Wilson, 2011; Miron, Branscombe, & Biernat, 2010; Sherman et al., 2007). However, the added value of group-affirmation to self-affirmation can be called into question, as the affirmation of the individual self can also provide a buffer against collective threats (Gunn & Wilson, 2011; Sherman & Cohen, 2006). Furthermore, it has been argued that the collective self is subordinate to the individual self as a basis of the self-definition (Gaertner, Sedikides, & Graetz, 1999), which can imply that people's main concern is to maintain a positive individual self-image and that group-affirmation may therefore be redundant in comparison to self-affirmation. Studies have demonstrated, however, that group-affirmation and self-affirmation can differ in terms of their effectiveness in coping with collective threats depending on the extent to which people perceive their group to be a part of their self-definition. For example, group-affirmation was advantageous over self-affirmation for highly identified group members in a context where they experienced stereotype threat during a performance task. Cardiovascular responses indicated that the task was experienced as a challenge after receiving a group-affirmation, thereby

showing that highly identified group members felt able to cope with the task, while the task was experienced as a threat – situational demands were perceived to tax or exceed personal resources – after the individual self was affirmed (Derks et al., 2011). It was suggested that highly identified group members are concerned about the effects of stereotype threat to the value of their group (Branscombe, Ellemers, Spears, & Doosje, 1999), which can be restored by affirming their social identity. No significant differences between self-affirmation and group-affirmation were found among low identified group members.

### **Justifying the wrongdoings of the ingroup**

While research has indicated that group-affirmation is effective in reducing defensive biases towards group-performance threats among people for whom the group is strongly linked to their self-definition (Derks et al., 2011; Derks et al., 2009; Sherman et al., 2007), little is known about the impact of group identification on the effectiveness of group-affirmation in comparison to self-affirmation in enhancing the acknowledgement of an ingroups' moral wrongdoings. Even though in-group competence can function as a status-defining feature (Bettencourt, Dorr, Charlton, & Hume, 2001), it has been demonstrated that ingroup morality is a more important characteristic for positive ingroup evaluation (Leach, Ellemers, & Barreto, 2007; Van Prooijen, Ellemers, Van der Lee, & Scheepers, in prep.). Additionally, judgments about competence are more open to improvement and less fixed than are judgments about morality, as positive information about competence is seen as more diagnostic and decisive than negative information, whereas these perceptions are reversed for morality judgments (Skowronski & Carlston, 1987). It is therefore likely that collective threats that involve performance judgments pose a different type of threat than collective threats that involve moral judgments about one's ingroup, which in turn may potentially

affect group-affirmation effectiveness. Although group-affirmation can attenuate defensiveness towards group performance threats by restoring the collective self (Derks et al., 2011; Derks et al., 2009; Sherman et al., 2007), it might be more challenging to protect the collective self from a threat to group morality, as a judgment about the groups' immorality is more defining than a judgment about the groups' incompetence (Wojciszke, 2005). In support of this line of reasoning, research has shown that self-affirmation was a more effective strategy to increase the acknowledgement of a nation's negative past behaviour in an intergroup conflict than was group-affirmation (Čehajić-Clancy, Effron, Halperin, Liberman, & Ross, 2011).

In the present study I aimed to extend prior research by examining how group identification can potentially lead to detrimental effects of group-affirmation on the justification of the actions of one's group that may cause harm to other people. Group membership is likely to be a more important aspect of the self-definition for people who highly identify with their group. By affirming an aspect of the self-concept that is defined by group membership, the cognitive salience of the collective self is increased (Derks et al., 2009). Focus of attention on the collective self has been shown to promote larger perceived differences between the ingroup and the outgroup (Skinner & Stephenson, 1981), enhance biased group evaluation (Hong & Harrod, 1988; Mullen, Brown, & Smith, 1992), and increase the blame attributed to people who were victims of wrongdoings (Van Prooijen & Van den Bos, 2009). Furthermore, ingroup pride is heightened by group-affirmation manipulations (Čehajić-Clancy et al., 2011; Miron et al., 2010), which in turn has been associated with stronger outgroup derogation (Branscombe & Wann, 1994; Wann & Grieve, 2005).

When there is a stronger link between the self-definition and group membership, negative information concerning the ingroup's morality is likely to be more threatening

to the self-concept and to evoke defensive biases than when group membership is not an important part of the self-image. I propose that affirming the collective self may enhance group biases in response to threats to group morality when group identification is high. That is, highlighting group membership through group-affirmation when facing actions conducted by the group that can be perceived as immoral may promote defensive responses, as the importance of the group to the self-concept is more salient. However, enhancing the individual self-image through self-affirmation may attenuate the need to defend the group, as an alternative source of self-worth that is unrelated to the group has been boosted.

### **The present study**

In the present study I focus on UK greenhouse gas emissions and their impact on global climate change problems. Climate change can present a collective threat for which multiple countries can be held accountable. As people often perceive the amount of unsustainable resources used by their nation and the national emissions of greenhouse gases as lower than that of other nations, the involvement of their nation in climate change problems tends to be justified or rejected (Norgaard, 2006; Opatow & Weiss, 2000). Perceived inequality in resource dilemmas between groups has been shown to lead to a reduction in cooperation and can function as a reason for groups to reject prosocial behavioural change (Aquino, Steisel, & Kay, 1992), which can have severe consequences for the mitigation of climate change. The nations which produce large amounts of greenhouse gases often have the financial capacity to take protective measures against potential climate change consequences. However, the disruption of the climate system is likely to be felt the most by people in developing countries, who emit low amounts of greenhouse gases and who cannot financially invest in mitigation actions (IPCC, 2007b). Climate change can therefore be perceived as a moral issue, as

the implications of substantial greenhouse gas emissions can cause harm among people who are hardly responsible for the problem (Lorenzoni & Pidgeon, 2006).

Whereas group-affirmation has more beneficial effects than self-affirmation for highly identified group members in contexts where group competence is threatened (Derks et al., 2011; Derks et al., 2009; Sherman et al., 2007), little is known about the moderating role of group identification on the different effects of group-affirmation and self-affirmation in contexts where group morality is threatened. I aim to test whether group-affirmation can evoke stronger group biases and a stronger rejection of the moral value of pro-environmental behaviour in response to a collective morality-related threat than self-affirmation depending on group identification. I suggest that for highly identified UK citizens, the salience of the collective self and the strengthening of their national pride through group-affirmation may make the threat to their nation more self-relevant. In contrast, low identified UK citizens are unlikely to perceive the threat to their nation as relevant to the self, as their nationality is not closely linked to their self-definition. I therefore expected that group-affirmation will promote a stronger need to justify the contribution of one's nation to a global problem and lower moral judgment about pro-environmental behaviour than self-affirmation among high identifiers, while low identifiers will not be affected by the type of affirmation.

Additionally, I have included ecological worldviews as a potential moderator in the current study, as previous research has shown that initial environmental beliefs can influence self-affirmation effects in a climate change context (Van Prooijen & Sparks, 2012; Van Prooijen, Sparks, & Jessop, in press). People with negative ecological worldviews, who tend to have low environmental concern and who are often sceptical about the human impact on climate change, are likely to reject anthropogenic climate change information due to the discrepancy between their beliefs and the evidence



presented in the information. In contrast, people with positive ecological worldviews, who have high environmental concern, are likely to be less resistant to anthropogenic climate change information due to their acceptance of the human impact on environmental problems. I therefore predicted that the differences between group-affirmation and self-affirmation effects on the need to justify the UK's contribution to climate change would only be apparent among people with negative ecological worldviews.

## **Method**

### **Participants**

Participants were 151 (119 females; 32 males) students with UK nationality. Their ages ranged from 18 years to 45 years ( $M = 21.26$ ,  $SD = 5.26$ ). Participants who completed the study were automatically included in a prize draw in which they had a chance of winning £100.

### **Design and procedure**

Participants were invited via email to complete two online questionnaires. The first questionnaire functioned as a pretest in which ecological worldviews and national identification were assessed. One week after completion of the first questionnaire a link to the second questionnaire was sent to participants. Participants were sequentially assigned to the group-affirmation or the self-affirmation condition.<sup>1</sup> Following the affirmation manipulation, the information about climate change and the outcome measures were introduced to the participants as an unrelated study.

### **Materials**

All measures were assessed with Likert-type scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A definition of a carbon footprint was provided before the outcome measures were presented.

**Ecological worldviews.** Ecological worldviews were assessed with the revised New Ecological Paradigm scale (NEP; Dunlap, Van Liere, Mertig, & Jones, 2000), which consisted of 15 items (e.g. “The so-called “ecological crisis” facing humankind has been greatly exaggerated”,  $\alpha = .77$ ).

**National identification.** Three items that were adapted from Branscombe, Schmitt, and Schiffhauer (2007) were used to measure national identification (e.g. “I am not embarrassed to admit that I am a UK citizen”,  $\alpha = .86$ ).

**Affirmation manipulation.** The affirmation manipulation was adapted from Čehajić-Clancy et al. (2011, Study 2). Participants in the group-affirmation condition ( $n = 72$ )<sup>2</sup> were asked to describe an achievement of the UK, how this achievement made them feel as a UK citizen, and what this achievement reflects about the UK. Participants in the self-affirmation condition ( $n = 79$ ) were asked to describe a personal achievement in their life, how this achievement made them feel, and what this achievement reflects about them.

**Climate change information.** The participants read a short text about the impact of greenhouse gases that are generated by human activity on climate change, the influence of climate change on poorer countries, the difference in greenhouse gas emissions between poorer countries and the UK, and the substantial contribution of the UK to climate change due to a strong overproduction of greenhouse gases.

**Outgroup blame.** Outgroup blame was measured with four items (e.g. “Most other western countries are more to blame for climate change than is the UK”,  $\alpha = .76$ ).

**Rejection of consequences.** Rejection of the consequences of the UK’s carbon emissions on developing countries was assessed with three items (e.g. “The harmful effects of the UK’s carbon emissions on poor countries are exaggerated”,  $\alpha = .79$ ).

**Moral judgment.** Two items from Van Prooijen et al. (2012) were used to measure moral judgment about pro-environmental behaviour: “It seems ethical to me to adjust one’s lifestyle in order to protect the earth” and “Trying to reduce your carbon footprint is the right thing to do”,  $r(149) = .75, p < .001$ .

**Group-efficacy.** Three items (adapted from Van Zomeren, Spears, & Leach, 2010) were used to assess group-efficacy with regard to reducing the consequences of climate change (e.g. “UK citizens can jointly reduce the negative consequences of climate change”,  $\alpha = .89$ ).

## Results

The outcome measures were analyzed with hierarchical regression analyses. Affirmation (1 = *group-affirmation* vs. 0 = *self-affirmation*) was entered as a main effect in Step 1, together with the mean-centred continuous variables national identification and ecological worldviews. The three two-way interactions between affirmation, national identification, and ecological worldviews were entered in Step 2. The three-way interaction between affirmation, national identification, and ecological worldviews was entered in Step 3. Significant three-way interactions were probed by examining the simple slopes of each outcome measure on affirmation for participants with low ( $-1\text{ SD}$ ) or high ( $+1\text{ SD}$ ) national identification in combination with negative ( $-1\text{ SD}$ ) or positive ( $+1\text{ SD}$ ) ecological worldviews (Preacher, Curran, & Bauer, 2006).

**Outgroup blame.** A main effect of ecological worldviews on outgroup blame was found,  $\beta = -.35, SE = .17, p = .001$ , semipartial  $R^2 = .06$ , as well as a marginal interaction between affirmation and national identification,  $\beta = .22, SE = .17, p = .06$ , semipartial  $R^2 = .02$ , and an interaction between national identification and ecological worldviews,  $\beta = .20, SE = .13, p = .05$ , semipartial  $R^2 = .02$ . These effects were qualified by a three-way interaction between affirmation, national identification, and

ecological worldviews,  $\beta = -.30$ ,  $SE = .20$ ,  $p = .01$ , semipartial  $R^2 = .04$  (see Figure 9). Highly identified participants with negative ecological worldviews reported more outgroup blame in the group-affirmation condition than in the self-affirmation condition,  $\beta = .34$ ,  $SE = .31$ ,  $p = .01$ , while low identified participants with negative ecological worldviews reported marginally more outgroup blame in the self-affirmation condition than in the group-affirmation condition,  $\beta = -.43$ ,  $SE = .53$ ,  $p = .07$ . No effects were found among participants with positive ecological worldviews,  $p > .16$ .

**Rejection of consequences.** The analysis revealed a main effect of ecological worldviews on rejection of consequences,  $\beta = -.27$ ,  $SE = .18$ ,  $p = .01$ , semipartial  $R^2 = .04$ , and an interaction between national identification and ecological worldviews,  $\beta = .25$ ,  $SE = .14$ ,  $p = .02$ , semipartial  $R^2 = .03$ , which were qualified by a three-way interaction between affirmation, national identification, and ecological worldviews,  $\beta = -.30$ ,  $SE = .22$ ,  $p = .01$ , semipartial  $R^2 = .04$  (see Figure 10). Simple slopes analyses showed that highly identified participants with negative ecological worldviews were more inclined to reject the impact of climate change consequences on developing countries in the group-affirmation condition than in the self-affirmation condition,  $\beta = .27$ ,  $SE = .32$ ,  $p = .04$ . A marginal effect emerged among low identified participants with negative ecological worldviews, in which rejection of consequences was negatively influenced by self-affirmation in comparison to group-affirmation,  $\beta = -.38$ ,  $SE = .56$ ,  $p = .10$ . Affirmation had no effect on positive ecological worldview participants,  $p > .50$ .

**Moral judgment.** Moral judgment of pro-environmental behaviour was influenced by main effects of ecological worldviews,  $\beta = .25$ ,  $SE = .13$ ,  $p = .01$ , semipartial  $R^2 = .03$ , and national identification,  $\beta = .25$ ,  $SE = .07$ ,  $p = .009$ , semipartial  $R^2 = .03$ . These main effects were qualified by an interaction between affirmation and

ecological worldviews,  $\beta = .22$ ,  $SE = .20$ ,  $p = .05$ , semipartial  $R^2 = .02$ , a marginal interaction between affirmation and national identification,  $\beta = -.18$ ,  $SE = .13$ ,  $p = .09$ , semipartial  $R^2 = .01$ , and an interaction between ecological worldviews and national identification,  $\beta = -.22$ ,  $SE = .10$ ,  $p = .03$ , semipartial  $R^2 = .02$ . Furthermore, as predicted, a three-way interaction between affirmation, national identification, and ecological worldviews was found,  $\beta = .29$ ,  $SE = .16$ ,  $p = .01$ , semipartial  $R^2 = .03$  (see Figure 11). Highly identified participants with negative ecological worldviews reported lower pro-environmental moral judgment in the group-affirmation condition than in the self-affirmation condition,  $\beta = -.62$ ,  $SE = .23$ ,  $p < .001$ . None of the other simple slopes were significant,  $p > .53$ .

**Group-efficacy.** The analysis yielded a marginal main effect of national identification on group-efficacy,  $\beta = .17$ ,  $SE = .09$ ,  $p = .09$ , semipartial  $R^2 = .02$ , and an interaction between national identification and ecological worldviews,  $\beta = -.32$ ,  $SE = .14$ ,  $p = .003$ , semipartial  $R^2 = .05$ , which were qualified by a three-way interaction between affirmation, national identification, and ecological worldviews,  $\beta = .42$ ,  $SE = .21$ ,  $p = .001$ , semipartial  $R^2 = .07$  (see Figure 12). The belief in group-efficacy regarding reducing the consequences of climate change was less strong in the group-affirmation condition than in the self-affirmation condition among highly identified participants with negative ecological worldviews,  $\beta = -.64$ ,  $SE = .31$ ,  $p < .001$ . No effects of affirmation were found among the other participants,  $p > .19$ .

## Discussion

While group-affirmation has been shown to be effective in reducing defensive biases towards collective performance-related threats among highly identified people (Derks et al., 2011; Derks et al., 2009; Sherman et al., 2007), it has not been examined how group identification may moderate group-affirmation effects when people are

confronted with collective morality-related threats. As morality has been shown to be a more important group characteristic than competence for a positive group evaluation (Leach et al., 2007; Van Prooijen et al., in prep.) and as a negative judgment about morality is more stable and difficult to change than a negative judgment about competence (Skowronski & Carlston, 1987; Wojciszke, 2005), it is likely that a collective competence threat might be less threatening to people who highly identify with their group than is a collective morality threat, which may influence the effectiveness of affirmation manipulations. In the current study I compared group-affirmation effects to self-affirmation effects on defensive biases towards the acceptance of the national contribution to climate change problems in developing countries, and I investigated how national identification and ecological worldviews moderated these effects. Previous research has shown that group-affirmation tends to result in higher levels of ingroup pride and higher salience of the collective self (Čehajić-Clancy et al., 2011; Derks et al., 2009; Miron et al., 2010), which in turn have both been associated with increased group biases (Branscombe & Wann, 1994; Mullen et al., 1992; Wann & Grieve, 2005). I hypothesized that a group-affirmation should promote a stronger need to justify group actions and a stronger rejection of the moral value of pro-environmental behaviour than self-affirmation among highly identified people, as the group-affirmation may increase the self-relevance of the collective threat. In contrast, I hypothesized that no differences between group-affirmation and self-affirmation would be found among low identified people, as the threat is likely to be perceived as irrelevant to the self-definition. Finally, I hypothesized that only people with negative ecological worldviews would respond defensively to climate change information, which would result in differences between group-affirmation and self-affirmation only among this group.

In support of my predictions, it was found that group-affirmation led to a greater need to justify the national contribution to climate change than did self-affirmation among highly identified participants with negative ecological worldviews; in comparison to self-affirmation, group-affirmation promoted the attribution of blame for climate change to other nations, more rejection of the consequences of climate change for developing countries, lower moral judgment about pro-environmental behaviour, and less group-efficacy with regard to mitigating climate change consequences. Low identified participants with negative ecological worldviews reported marginally lower outgroup blame and rejection of climate change consequences after group-affirmation than after self-affirmation. A possible explanation for these findings might be that, as group membership is not strongly linked to the self-image, the collective threat might not activate a threat to the self for low identifiers, which may reduce the effectiveness of affirming the individual self. Whereas the salience of the group appears to enhance defensive biases against collective morality threats among highly identified people, a group-affirmation may actually boost the collective self without increasing the motivation to protect the positive group-image among low identifiers. I also found that, consistent with prior research (Van Prooijen et al., in press; Van Prooijen & Sparks, 2012), ecological worldviews were a significant moderator of affirmation effects. The differences between group-affirmation and self-affirmation were only apparent among participants with negative ecological worldviews, who are likely to be resistant towards climate change information.

The present research suggests that the effectiveness of group-affirmation in comparison to self-affirmation in the context of a collective threat does not only depend on group identification, but that it is also important to distinguish whether a collective threat is related to morality or competence characteristics of the ingroup. Whereas

group-affirmation has been shown to be a better coping strategy than self-affirmation for highly identified people when faced with a collective competence-related threat (Derks et al., 2011; Derks et al., 2009; Sherman et al., 2007), my findings indicate that this effect is reversed when people are confronted with a threat that could jeopardize the moral image of the ingroup. I thereby extended prior research that demonstrated that self-affirmation led to more acknowledgment of the ingroup's wrongdoings in an intergroup conflict than did group-affirmation (Čehajić-Clancy et al., 2011) by showing that these effects were limited to people who highly identify with the group.

There are several limitations of the current study that need to be addressed. First, I did not include an established control condition in the design. Although my main aim was to examine the differences between group-affirmation and self-affirmation, more research is needed to determine whether group-affirmation increases group biases or whether group-affirmation has no effects on group biases among high identifiers. Second, it should be noted that I did not directly compare group-affirmation effects on collective morality-related threats with group-affirmation effects on collective competence-related threats. While the findings on the moderating role of identification on group-affirmation effects in a collective morality-related threat context clearly show an opposite pattern from the effects found in a context with a collective performance-related threat (Derks et al., 2011; Derks et al., 2009; Sherman et al., 2007), and while these findings are in line with earlier findings of group-affirmation effects on responses to a collective morality-related threat (Čehajić-Clancy et al., 2011), further research in which threats to group morality are compared with threats to group competence would enable us to directly establish whether the type of threat influences affirmation effects.

Group-affirmation has been shown to be a useful strategy to cope with collective threats by reducing defensive biases (Derks et al., 2011; Derks et al., 2009; Sherman et



al., 2007). However, even though boosting the collective self has beneficial effects, it is useful to consider the negative consequences that have been associated with the salience of group-identity, such as increase in group biases (Mullen et al., 1992). My findings show that, when information that can challenge the morality of the group is presented to people for whom group membership is important to the self-image, self-affirmation is a better coping strategy to decrease defensive biases that stem from the need to protect the positive group-image than is group-affirmation.

## Footnotes

<sup>1</sup> The design originally included a control condition (adapted from Jordan, Mullen, and Murnighan, 2011, Study 2), in which participants were asked to describe what they usually do on a typical Tuesday. No differences between the control condition and the affirmation conditions were found on the outcome measures. However, I suspect that summing up what someone usually does on a typical Tuesday may unintentionally provide a sense of achievement, which could have confounded the effects of the affirmation manipulation and which might imply that the control condition was not a neutral task. Additionally, it should be noted that Jordan et al. did not use the task in the context of a self-affirmation study, and the control condition has never been used as an established manipulation within self-affirmation literature. The data from the control condition are therefore not discussed here.

<sup>2</sup> Originally 76 participants completed the group-affirmation condition. However, four participants were excluded from data-analysis as they did not follow the instructions given in the manipulation. Three participants reported failures of the UK, and one participant did not provide an answer. The exclusion of these participants did not significantly change the findings.

## Figures

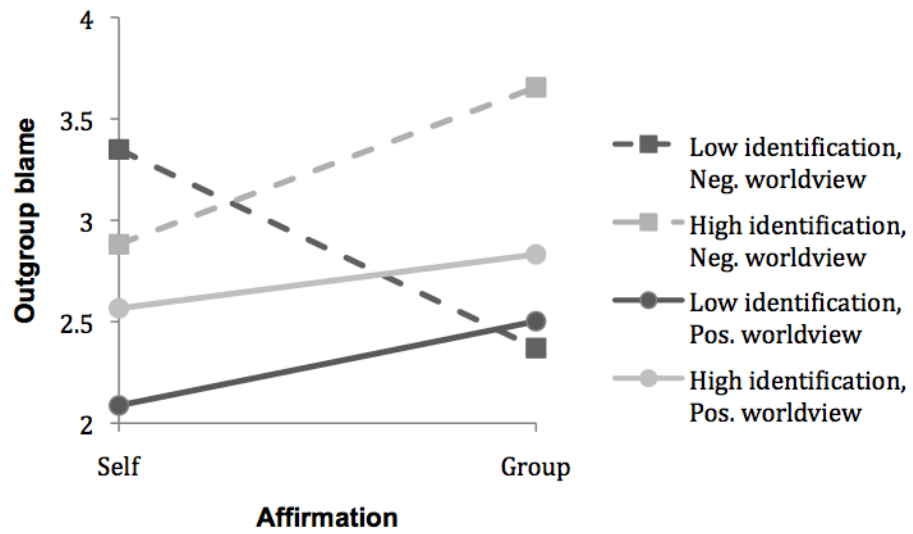
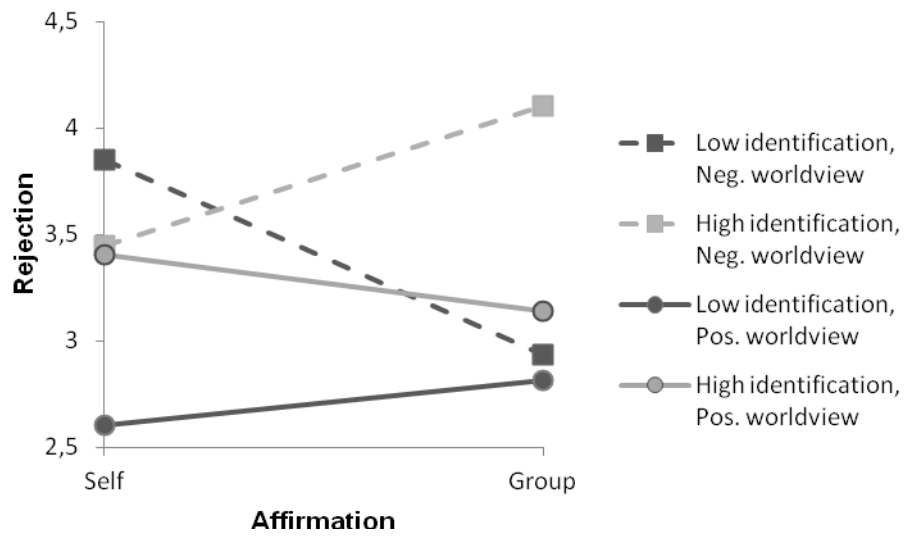
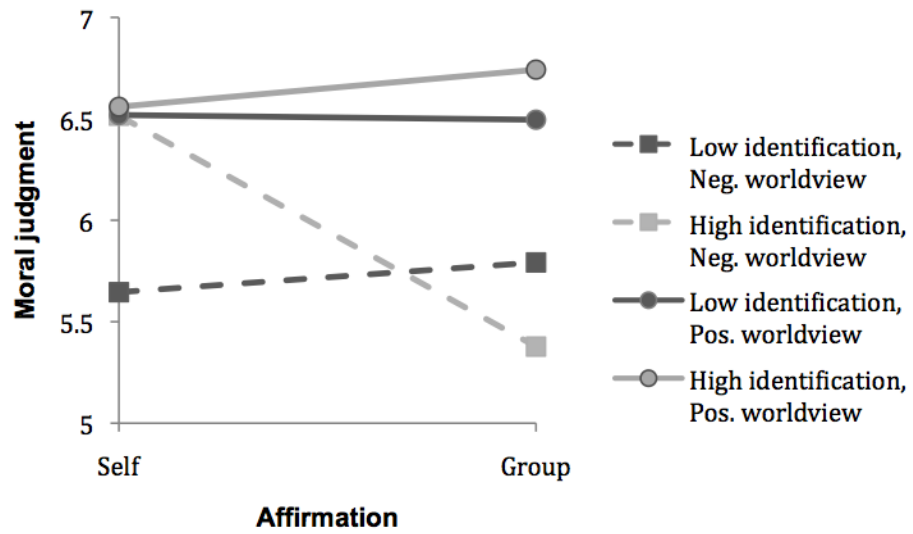


Figure 9. Outgroup blame regressed onto national identification and ecological worldviews, by affirmation.



*Figure 10.* Rejection of consequences regressed onto national identification and ecological worldviews, by affirmation.



*Figure 11.* Moral judgment regressed onto national identification and ecological worldviews, by affirmation.

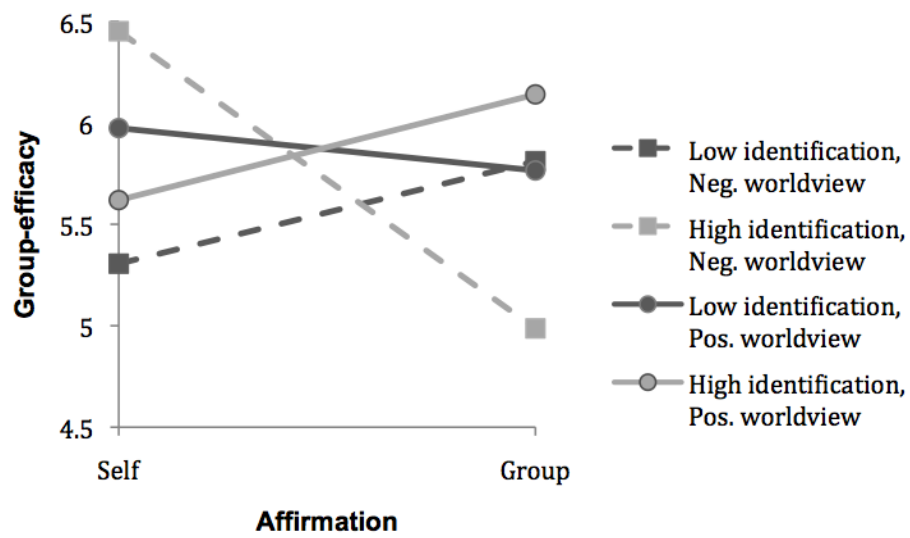


Figure 12. Group-efficacy regressed onto national identification and ecological worldviews, by affirmation.

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## APPENDIX 1

### Materials Used in Chapter 2

**Pretest Measure (Study 2 and Study 3)*****Possibility of an ecological crisis items***

Humans are severely abusing the environment (reversed scored).

The so-called “ecological crisis” facing humankind has been greatly exaggerated.

If things continue on their present course, we will soon experience a major ecological catastrophe (reversed scored).

## **Affirmation Manipulation (Study 1 and Study 2)**

### ***Kindness-affirmation condition***

The following questions are designed to measure level of kindness toward others. These questions refer to behaviours that YOU have performed for other people. As you read each question, please try to recall a time when YOU performed each behaviour for another person. There are no right or wrong answers, so please be as honest as possible. Please tick the box next to the answer that best describes your behaviour toward other people. If you answer YES to any of the questions, please provide a short example of the last time you performed this behaviour.

1. Have you ever forgiven another person when they have hurt you?

**Yes** ☐                      **No** ☐

If **Yes**, example:

2. Have you ever been considerate of another person's feelings?

**Yes** ☐                      **No** ☐

If **Yes**, example:

3. Have you ever been concerned with the happiness of another person?

**Yes** ☐                      **No** ☐

If **Yes**, example:

4. Have you ever looked out for another person's interests before your own?

**Yes** ☐                      **No** ☐

If **Yes**, example:

5. Have you ever been generous and selfless to another person?

**Yes** ☐                      **No** ☐

If **Yes**, example:

6. Have you ever attended to the needs of another person?

**Yes** ☐ **No** ☐

If **Yes**, example:

7. Have you ever tried not to hurt the feelings of another person?

**Yes** ☐ **No** ☐

If **Yes**, example:

8. Have you ever felt satisfied when you've helped another person?

**Yes** ☐ **No** ☐

If **Yes**, example:

9. Have you ever gone out of your way to help a friend even at the expense of your own happiness?

**Yes** ☐ **No** ☐

If **Yes**, example:

10. Have you ever found ways to help another person who was less fortunate than yourself?

**Yes** ☐ **No** ☐

If **Yes**, example:

**Affirmation Manipulation (Study 1 and Study 2)*****Control condition***

The following questions are designed to measure personal opinions. These questions refer to YOUR opinions on each topic. There are no right or wrong answers, so please be as honest as possible. Please tick the box next to the answer that best describes YOUR opinion. If you answer YES to any of the questions, please provide a reason why you believe this statement to be true.

1. I think that the colour blue looks great on most people.

**Yes** ☐ **No** ☐

If **Yes**, why?

2. I think that chocolate is the best flavour for ice cream.

**Yes** ☐ **No** ☐

If **Yes**, why?

3. I think that winter is the most satisfying season during the year.

**Yes** ☐ **No** ☐

If **Yes**, why?

4. I think that the most aromatic trees in the world are pine trees.

**Yes** ☐ **No** ☐

If **Yes**, why?

5. I think that cooking is an important skill to possess.

**Yes** ☐ **No** ☐

If **Yes**, why?

6. I think that house plants help to brighten a home.

**Yes** ☐ **No** ☐

If **Yes**, why?

7. I think that sewing is an important skill to possess.

**Yes** ☐

**No** ☐

If **Yes**, why?

8. I think that the beach is a great place to vacation.

**Yes** ☐

**No** ☐

If **Yes**, why?

9. I think that the subway is the best form of public transportation.

**Yes** ☐

**No** ☐

If **Yes**, why?

10. I think that fruit makes the best dessert.

**Yes** ☐

**No** ☐

If **Yes**, why?



### **Affirmation Manipulation (Study 3)**

#### ***Value-affirmation condition***

In the present study we are interested in investigating people's values. By values we mean the principles and standards by which people try to live their lives. For example, honesty might be a core value for some people. That is, they may try to be honest in all they do – whether in dealing with other people or working. Following are some personal values that people have described as important to them.

<b>Altruism</b>	<b>Spontaneity</b>	<b>Forgiveness</b>	<b>Loyalty</b>
<b>Honesty</b>	<b>Goodness</b>	<b>Religiousness</b>	<b>Tolerance</b>
<b>Creativity</b>	<b>Sincerity</b>	<b>Fairness</b>	<b>Resourcefulness</b>

Please select the value from the list above that is **most** important to you, and write it in the space provided. If more than one value is equally important to you then please select just one to write about.

The most important value to me is:.....

In the space below please write a short statement (around 2-3 sentences) about why this value is important to **you**. Take a couple of minutes to think about this value and how this value has influenced things that you have done. Please write about how you use this value in your everyday life.

.....

.....

.....

.....

### Affirmation Manipulation (Study 3)

#### *Control condition*

In the present study we are interested in investigating people's values. By values we mean the principles and standards by which people try to live their lives. For example, honesty might be a core value for some people. That is, they may try to be honest in all they do – whether in dealing with other people or working. Following are some personal values that people have described as important to them.

<b>Altruism</b>	<b>Spontaneity</b>	<b>Forgiveness</b>	<b>Loyalty</b>
<b>Honesty</b>	<b>Goodness</b>	<b>Religiousness</b>	<b>Tolerance</b>
<b>Creativity</b>	<b>Sincerity</b>	<b>Fairness</b>	<b>Resourcefulness</b>

Please select the value from the list above that is **least** important to you, and write it in the space provided.

The least important value to me is:.....

In the space below please write a short statement (around 2-3 sentences) about why this value might be important to **someone else**, and how this value might influence **their** everyday life.

.....

.....

.....

.....

### **Climate Change Information (Study 1, Study 2 and Study 3)**

Climate change refers to the variation in the Earth's climate over a period of time. It has recently been widely acknowledged that human action has had a significant effect on the change of climate in modern times.

*Please read the following statements about climate change, taken from a variety of sources and answer briefly the questions below each statement.*

“The evidence is there. The damage is being done. What do we, the international community, do about it? In some areas, the action required is primarily for individual nations to take. But the problem of global climate change is one that affects us all and action will only be effective if it is taken at the international level. It is no good squabbling over who is responsible or who should pay. We have to look forward not backward, and we shall only succeed in dealing with the problems through a vast international, co-operative effort” *Extract from a speech by Margaret Thatcher to the United Nations, 8<sup>th</sup> November, 1989*

#### **A) Who does the author suggest will be affected by climate change?**

“We have to confront this threat...Unfortunately the media all too often does this in a way that relegates the most important issue facing our species as if it was a soccer match between two competing sides of equal strength. It's not. If you want to compare it (the debate over the existence of global warming) to a football match, it is more like Manchester United taking on three primary school children. It is as ridiculous as that....On one hand, you have the entire scientific community and on the other you have a handful of people, half of them crackpots. Nevertheless, this is still presented as an unresolved battle. That is simply not true. It has been resolved. Only the details of climatic change's impact have still to be worked out”. *Robert May, President of the Royal Society, on Climate Change*

#### **B) What does the author suggest is the only thing still to be worked out?**

“In my view, climate change is the most severe problem we are facing today, more serious even than the threat of terrorism...”

*Sir David King, the UK government chief scientist, BBC News, Wednesday 31 March 2004, 03.16 GMT 04.16 UK*

“So asking wealthy people in the rich nations to act to prevent climate change means asking them to give up many of the things they value - their high performance cars, their flights to Tuscany and Thailand and Florida - for the benefit of other people...The problem is compounded by the fact that the connection between cause and effect seems so improbable. By turning on the lights, filling the kettle, taking the children to school, driving to the shops, we are condemning other people to death. We never choose to do this. We do not see ourselves as killers. We perform these acts without passion or intent.” *George Monbiot, 2006*

**C) According to this author, preventing climate change requires people to do what exactly?**

“Deadly it may be, but when we pass the threshold of climate change there may be nothing perceptible to mark this crucial step, nothing to warn that there is no returning...Humanity, wholly unprepared by its humanist traditions, faces its greatest trial. The acceleration of the climate change now under way will sweep away the comfortable environment to which we are adapted...Why are we so slow...to see the great peril that faces us and civilization? What stops us from realizing that the fever of global heating is real and deadly and might already have moved outside our and the Earth’s control? *James Lovelock, The Revenge of Gaia, 2006*

**D) What does this author suggest that climate change will sweep away?**

“...I am not the sandal-wearing fanatic of sceptic legend, wishing my dismal life-style on everyone else. I burn coal fires in winter, I’m off to New Zealand this year, and I estimate my home has a hundred electric light bulbs, though they’re not all on at once. That’s why I don’t hold out much hope. Having been convinced that global warming is a genuine threat, I still think, deep down, that you only live once and my own carbon footprint won’t make much of a difference. Which is just what everyone else thinks”  
*Peter Wilby, 2007*

**E) Why does this author not hold out much hope?**

**Manipulation Check Measures (Study 1)*****Self-feelings item***

How do you feel about yourself right now?

***Mood item***

How would you describe your mood right now?

***Kindness item***

How kind do you consider yourself to be?

## **Outcome Measures**

### ***Climate change scepticism items (Study 1, Study 2, and Study 3)***

Climate change is too complex and uncertain for scientists to make useful forecasts.

Claims that human activities are changing the climate are exaggerated.

I do not believe climate change is a real problem.

Floods and heat-waves are not increasing, there is just more reporting of it in the media these days.

The media is often too alarmist about issues like climate change.

Climate change is just a natural fluctuation in earth's temperatures.

There is too much conflicting evidence about climate change to know whether it is actually happening.

I am uncertain about whether climate change is really happening.

Many leading experts still question if human activity is contributing to climate change.

Too much fuss is made about climate change.

The evidence for climate change is unreliable.

It is too early to say whether climate change is really a problem.

Talking about climate change is boring.

### ***Commitment to protect the environment items (Study 1)***

I feel a strong commitment to being environmentally conscious.

The global warming problem truly concerns me.

I feel 'emotionally engaged' with environmental issues.

I believe that people don't care enough about global warming.

It seems ethical to me to adjust one's lifestyle in small ways in order to act more responsibly for the planet.

I believe being environmentally conscious is a moral obligation.

### ***Message derogation items (Study 2 and Study 3)***

I thought the information about climate change was overblown.

I thought the information about climate change was exaggerated.

I thought the information about climate change tried to manipulate my feelings.

I thought the information about climate change tried to strain the truth.

## APPENDIX 2

### Materials Used in Chapter 3

## Pretest Measure

### *New Ecological Paradigm items*

We are approaching the limit of the number of people the earth can support.

Humans have the right to modify the natural environment to suit their needs (reversed scored).

When humans interfere with nature it often produces disastrous consequences.

Human ingenuity will insure that we do NOT make the earth unliveable (reversed scored).

Humans are severely abusing the environment.

The earth has plenty of natural resources if we just learn how to develop them (reversed scored).

Plants and animals have as much right as humans to exist.

The balance of nature is strong enough to cope with the impacts of modern industrial nations (reversed scored).

Despite our special abilities humans are still subject to the laws of nature.

The so-called “ecological crisis” facing humankind has been greatly exaggerated (reversed scored).

The earth is like a spaceship with very limited room and resources.

Humans were meant to rule over the rest of nature (reversed scored).

The balance of nature is very delicate and easily upset.

Humans will eventually learn enough about how nature works to be able to control it (reversed scored).

If things continue on their present course, we will soon experience a major ecological catastrophe.



## **Affirmation Manipulation**

### ***Affirmation condition***

In the present study we are interested in investigating people's values. By values we mean the principles and standards by which people try to live their lives. For example, honesty might be a core value for some people. That is, they may try to be honest in all they do – whether in dealing with other people or working. Following are some personal values that people have described as important to them.

<b>Altruism</b>	<b>Fairness</b>	<b>Forgiveness</b>
<b>Goodness</b>	<b>Honesty</b>	<b>Kindness</b>
<b>Loyalty</b>	<b>Sincerity</b>	<b>Tolerance</b>

Please select the value from the list above that is **most** important to you, and write it in the space provided. If more than one value is equally important to you then please select just one to write about.

The most important value to me is:.....

In the space below please write a short statement (around 2-3 sentences) about why this value is important to **you**. Take a couple of minutes to think about this value and how this value has influenced things that you have done. Please write about how you use this value in your everyday life.

### ***Control condition***

In the present study we are interested in investigating people's general eating and drinking habits. Please try to write down everything that you have eaten or drunk in the past 48 hours. There is no need to worry about those things you find yourself unable to remember!

**Definition Carbon Footprint**

In some of the following questions we will ask you about your carbon footprint. A carbon footprint is the sum of all emissions of CO<sub>2</sub> (carbon dioxide), which were induced by your activities in a given time frame.

**A low carbon footprint is an indication of an environmentally friendly lifestyle.**

## **Outcome Measures**

### ***Moral judgment items***

It seems ethical to me to adjust one's lifestyle in order to protect the earth.

Trying to reduce my carbon footprint is the right thing to do.

### ***Perceived effort required to reduce carbon footprint items***

I would need to carefully prepare a change in my lifestyle if I wanted to reduce my carbon footprint.

It would take much effort to reduce my carbon footprint.

It would be a challenge for me to reduce my carbon footprint.

I would need to make a significant commitment in order to reduce my carbon footprint.

It would require a significant change in my behaviour for me to reduce my carbon footprint substantially.

### ***Self-efficacy items***

There are simple things I can do that contribute to preventing the negative consequences of climate change.

I can change my daily routines to help combat climate change.

There are things I can do that can make a difference in preventing the negative consequences of climate change.

My individual actions will make a contribution to a solution of the climate change problem.

Changes in my daily routines will make a contribution to preventing the negative consequences of climate change.

### ***Pro-environmental intentions items***

I intend to reduce my carbon footprint from now on.

I shall try to reduce my carbon footprint from now on.

I shall make an effort to reduce my carbon footprint from now on.

I intend to behave more environmentally friendly from now on.

I shall try to behave more environmentally friendly from now on.

I shall make an effort to behave more environmentally friendly from now on.

## APPENDIX 3

### Materials Used in Chapter 4

**Pretest Measure*****Fragility of nature's balance items***

When humans interfere with nature it often produces disastrous consequences.

The balance of nature is strong enough to cope with the impacts of modern industrial nations (reversed scored).

The balance of nature is very delicate and easily upset.

## **Affirmation Manipulation**

### ***Affirmation condition***

In the present study we are interested in investigating people's values. By values we mean the principles and standards by which people try to live their lives. For example, honesty might be a core value for some people. That is, they may try to be honest in all they do – whether in dealing with other people or working. Following are some personal values that people have described as important to them.

<b>Altruism</b>	<b>Fairness</b>	<b>Forgiveness</b>
<b>Goodness</b>	<b>Honesty</b>	<b>Kindness</b>
<b>Loyalty</b>	<b>Sincerity</b>	<b>Tolerance</b>

Please select the value from the list above that is **most** important to you, and write it in the space provided. If more than one value is equally important to you then please select just one to write about.

The most important value to me is:.....

In the space below please write a short statement (around 2-3 sentences) about why this value is important to **you**. Take a couple of minutes to think about this value and how this value has influenced things that you have done. Please write about how you use this value in your everyday life.

### ***Control condition***

In the present study we are interested in investigating people's general eating and drinking habits. Please try to write down everything that you have eaten or drunk in the past 48 hours. There is no need to worry about those things you find yourself unable to remember!

## **Climate Change Information**

During the twentieth century, the earth's surface warmed by about 0.74° C, according to the Intergovernmental Panel on Climate Change (IPCC). Science has made great strides in determining the potential causes for that change. The IPCC's Fourth Assessment Reports in 2007 stated that warming of the climate system is "unequivocal" and that most of the observed increase in global average temperatures since the mid-twentieth century is "very likely" due to the rise in greenhouse gases generated by human activity.

The IPCC's Fourth Assessment Report observed that between 1970 and 2004, greenhouse gas emissions increased by 70 per cent, and carbon dioxide (CO<sub>2</sub>) – by far the largest source with 77 per cent of total emissions – grew by about 80 per cent. Atmospheric concentrations of CO<sub>2</sub>, methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O), the IPCC found, had risen markedly since 1750 due to human activity, and today, far exceed pre-industrial values.

Projections indicate that if emissions are allowed to rise at their current pace and double from pre-industrial levels, the world would likely face a 2° - 4.5° C temperature rise by 2100, with a 3°C increase most likely.

There is near universal acceptance that complete avoidance of climate change is now impossible and that adaptive capacity needs to be improved everywhere, including in high-income countries. Disruption in the climate system is manifesting itself around the world through more frequent floods, droughts and heat waves whose severity will only increase. A wide range of adaptation options is available, including disaster risk reduction efforts, insurance and other risk transfer mechanisms. Their widespread use is needed to reduce the vulnerability of high-risk communities to inevitable climate impacts.

Under the IPCC's most stringent emissions reduction scenario, the world has a 50 per cent chance of limiting further temperature increases to 2° C. Achieving that would require a comprehensive global mitigation effort, including a further tightening of existing climate policies in developed countries and concurrent emissions reductions in developing nations. In other words, the world would need to see an emissions peak

before 2020 and a 50 per cent reduction below 1990 levels by 2050. For industrialized nations, that translates to a 25-40 per cent emissions reduction below 1990 levels by 2020.

The impacts associated with such a scenario are serious but widely regarded as more manageable if a risk reduction approach is fully embraced. However, without action, there is overwhelming scientific evidence that climate change will threaten economic growth and survival of the world's most vulnerable populations:

- By 2020, some 75 to 250 million people in Africa will face increased water shortages. Yields from rain-fed agriculture (dominant method) could fall by up to 50 per cent in some African countries.
- About 20-30 per cent of plant and animal species will likely face increased risk of extinction if global average temperature increases exceed 1.5°-2.5° C.
- Widespread melting of glaciers and snow cover will create risk of flash floods and, over time, reduce annual melt water from major mountain ranges (i.e.: Hindu-Kush, Himalaya, Andes), where more than one billion people live.
- Seven of ten disasters are now climate-related.
- More than 20 million people were displaced by sudden climate-related disasters in 2008 alone. An estimated 200 million could be displaced as a result of climate impacts by 2050.

*Sources: IPCC, UN, Stern Review 2006*



**Definition Carbon Footprint**

In some of the following questions we will ask you about your carbon footprint. A carbon footprint is the sum of all emissions of CO<sub>2</sub> (carbon dioxide), which were induced by your activities in a given time frame.

**A low carbon footprint is an indication of an environmentally friendly lifestyle.**

## Outcome Measures

### *Perceptions of global consequences items*

I think that it is likely that there will be water shortages worldwide due to climate change in the next 50 years if carbon emissions are not significantly reduced.

I think that it is likely that there will be an increase in rates of disease worldwide due to climate change in the next 50 years if carbon emissions are not significantly reduced.

I think that it is likely that there will be a decrease in standards of living worldwide due to climate change in the next 50 years if carbon emissions are not significantly reduced.

### *Perceptions of national consequences items*

I think that it is likely that there will be water shortages in the UK due to climate change in the next 50 years if carbon emissions are not significantly reduced.

I think that it is likely that there will be an increased rate of disease in the UK due to climate change in the next 50 years if carbon emissions are not significantly reduced.

I think that it is likely that there will be a decreased standard of living in the UK due to climate change in the next 50 years if carbon emissions are not significantly reduced.

### *Self-efficacy items*

There are simple things I can do that contribute to preventing the negative consequences of climate change.

There are things I can do that can make a difference in preventing the negative consequences of climate change.

My individual actions will make a contribution to a solution of the climate change problem.

Changes in my daily routines will make a contribution to preventing the negative consequences of climate change.

**Outcome Measures*****Pessimism items***

When I read the information pages, I felt hopeless.

When I read the information pages, I felt a general feeling of pessimism.

When I read the information pages, I felt a sense of futility.

When I read the information pages, I felt helpless.

***Pro-environmental intentions items***

I intend to reduce my carbon footprint from now on.

I shall try to reduce my carbon footprint from now on.

I shall make an effort to reduce my carbon footprint from now on.

I intend to behave more environmentally friendly from now on.

I shall try to behave more environmentally friendly from now on.

I shall make an effort to behave more environmentally friendly from now on.

## APPENDIX 4

### Materials Used in Chapter 5

## **Pretest Measures**

### ***New Ecological Paradigm items***

We are approaching the limit of the number of people the earth can support.

Humans have the right to modify the natural environment to suit their needs (reversed scored).

When humans interfere with nature it often produces disastrous consequences.

Human ingenuity will insure that we do NOT make the earth unliveable (reversed scored).

Humans are severely abusing the environment.

The earth has plenty of natural resources if we just learn how to develop them (reversed scored).

Plants and animals have as much right as humans to exist.

The balance of nature is strong enough to cope with the impacts of modern industrial nations (reversed scored).

Despite our special abilities humans are still subject to the laws of nature.

The so-called “ecological crisis” facing humankind has been greatly exaggerated (reversed scored).

The earth is like a spaceship with very limited room and resources.

Humans were meant to rule over the rest of nature (reversed scored).

The balance of nature is very delicate and easily upset.

Humans will eventually learn enough about how nature works to be able to control it (reversed scored).

If things continue on their present course, we will soon experience a major ecological catastrophe.

### ***National identification items***

I believe that UK citizens have a lot to be proud of.

I am not embarrassed to admit that I am a UK citizen.

I am proud to be a UK citizen.

**Affirmation Manipulation*****Self-affirmation condition***

In this first study we are interested in investigating personal achievements that people have experienced. Please describe a personal achievement in your life (around 2-3 sentences). Try to write about how this personal achievement makes you feel, and what this achievement reflects about you.

***Group-affirmation condition***

In this first study we are interested in investigating the UK's achievements. Please describe an achievement of the UK (around 2-3 sentences). Try to write about how this achievement of the UK makes you feel as a UK citizen, and what this achievement reflects about the UK.

## **Climate Change Information**

There is a strong scientific consensus that the Earth is getting warmer, and that most of the observed increase in global average temperatures since the mid-twentieth century is due to the rise in greenhouse gases generated by human activity. The impact of this climate change will be felt most by the poorest people in the world – those who contribute little to nothing to the problem. Disruption in the climate system is already manifesting itself around the world through more frequent floods, droughts and heat waves. The severity of these consequences will increase if current greenhouse gas emissions are not reduced.

The UK is a massive overproducer of the main greenhouse gas, carbon dioxide (CO<sub>2</sub>). It takes only 40 days for the UK to produce as much CO<sub>2</sub> per person as most poor countries will in a year. Over 84 per cent of the world's population live in countries which emit less CO<sub>2</sub> per person than the UK. The UK was the first country which started contributing to climate change: In 1830, the UK began emitting more CO<sub>2</sub> per year than the current sustainable level. The UK can move towards its sustainable goals if UK citizens are prepared to take simple steps to reduce their carbon emissions.

**Definition Carbon Footprint**

In some of the following questions we will ask you about your **carbon footprint**. A carbon footprint is the sum of all emissions of CO<sub>2</sub> (carbon dioxide), which are induced by your activities within a given time frame.

**A low carbon footprint is an indication of an environmentally friendly lifestyle.**



## **Outcome Measures**

### ***Outgroup blame items***

Other western countries that contribute to climate change should modify their actions before the UK is required to reduce its carbon emissions.

The UK does not need to reduce its carbon emissions if other western countries maintain their high levels of carbon emissions.

Most other western countries are more to blame for climate change than is the UK.

In comparison to other western countries, the UK has a very minimal impact on climate change.

### ***Rejection of consequences items***

The UK's carbon emissions will only have a minor influence on weather-related disasters in poor countries.

There is a strong relationship between weather-related disasters in poor countries and the UK's carbon emissions (reversed scored).

The harmful effects of the UK's carbon emissions on poor countries are exaggerated.

### ***Moral judgment items***

It seems ethical to me to adjust one's lifestyle in order to protect the earth.

Trying to reduce your carbon footprint is the right thing to do.

### ***Group-efficacy items***

UK citizens can jointly reduce the negative consequences of climate change.

Individuals in the UK can collectively reduce the negative consequences of climate change.

UK citizens can together, through joint effort, achieve the goal of reducing the negative consequences of climate change.